

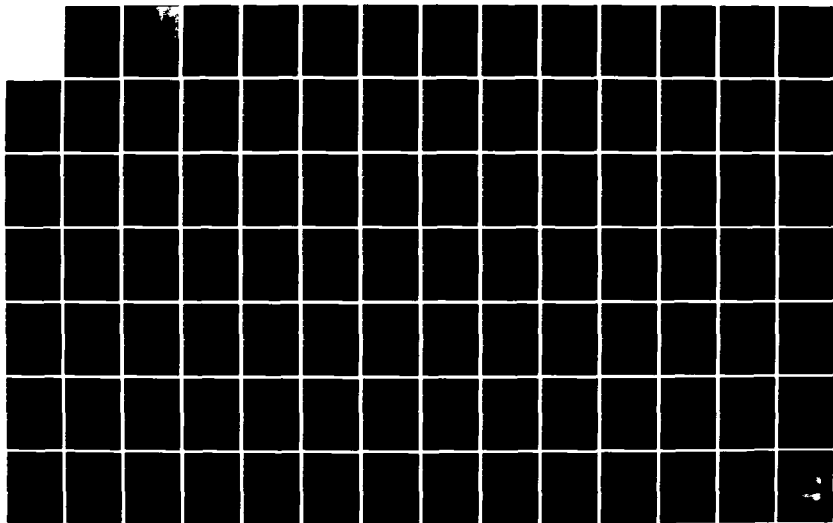
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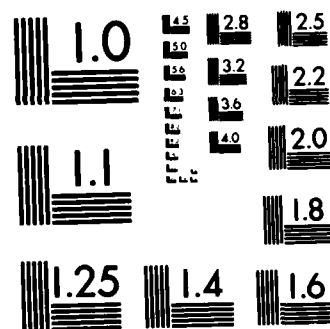
MERCED COUNTY STREAMS PROJECT BEAR RESERVOIR CALIFORNIA 1/2
INTENSIVE CULTURAL RESOURCES SURVEY(U) PEAK AND
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INTENSIVE CULTURAL RESOURCES SURVEY

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MERCED COUNTY STREAMS PROJECT,
BEAR RESERVOIR, CALIFORNIA

INTENSIVE CULTURAL RESOURCES SURVEY

performed under

Contract #DACW05-81-C-0097

by

PEAK & ASSOCIATES, INC.
8167A Belvedere Ave.
Sacramento, CA 95826

for

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
650 Capitol Mall
Sacramento, CA 95814

March 1982

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ABSTRACT

Peak and Associates have undertaken the cultural resource survey of the proposed enlarged Bear Reservoir. The project is part of the Corps of Engineers Merced County Streams Project. The area to be impacted totals 836 acres, including the gross pool of the proposed new reservoir, as well as the associated constructional features. In addition, a total of 30 acres will be impacted by the borrow area downstream. A total of 31 resources was found and recorded. The site types found were many and varied, including three petroglyph sites, 11 isolated bedrock mortar loci, three middens, nine complex sites (sites with multiple features and/or components), and five historic sites which have structural remains. The richness and diversity of the resources, their seemingly internal integrity, and their relatively pristine condition suggest the nomination of the 30 sites within the reservoir to the National Register of Historic Places as a district. Site CA-Mer-237 is not recommended to be nominated. The mitigative alternatives are predicated upon the status of the project, the projected impacts, and the nature of the resources. Preservation was emphasized as the best mitigative alternative; if not possible, then the mitigative measures proposed were based upon the degree of expected impacts. The impacts expected are damage due to construction and inundation. The results of the study were hampered by a lack of temporally diagnostic artifacts. The overall consensus of the prehistoric sites argues for a late manifestation in the Upper Emergent for all of the resources encountered. The historic resources are predominantly from the mining and ranching period.

ACKNOWLEDGMENTS

No large archeological project/report is the product of one individual. Rather it is a cooperative effort from many people at all stages of the project. In acknowledgment of this, we wish to thank not only the people who contributed with their direct involvement but all others who offered support and encouragement.

We are especially appreciative of the cooperation and assistance offered by the U.S. Army Corps of Engineers personnel who helped in interpretation of plans and hydrologic data. Patti Johnson, District Archeologist, participated in field review and has provided us with positive critical review of the report during the various preparation stages.

There is no doubt that the field crew deserves a very large share of the credit as they were more than competent and meticulous in identifying and recording the complex cultural resources within this study area. It was a pleasure to have excellent comprehensive field notes and illustrations as the preparation of the report was made so much easier. Despite the extremely hot weather and the long daily walk to and from the work areas, the crew members maintained a high quality of work and retained their good humor. Our deepest thanks to our crew chiefs, Robert Gerry, Richard Kardash, Larry McKee, and Melinda Peak; and to the technicians, Barry Boyer, Herb Dallas, Hannah Gibbs, Stuart Guedon, Sherri Gust, Les Harville, Paul Neimoyer, Patricia Perkins, and William Slater.

The Native American Observer was John (Rusty) Brocchini from the American Indian Council of Mariposa County. Rusty was a great asset to the team, providing insight into Native American values and concerns and also participating in all phases of the field work. His most valuable contribution, in terms of the field work, was in making meticulous scaled drawings of the petroglyphs at the several loci. He also acted as liaison with the interested Native American community. We also appreciated the time and effort expended by the Indian people.

The excellent maps, historic feature illustrations, and petroglyph replications are the product of Robert Gerry, Stuart Guedon, and Rick Kardash, who expended hundreds of hours on them.

Jeanne Muñoz deserves a great deal of credit for acting as our coordinator with the Native American people and for compiling the Historic Overviews. She was ably assisted by the Historic Researcher, Melinda Peak.

Dr. L. K. Napton, California State College, Stanislaus, was more than cooperative in providing permanent trinomials for the cultural resources even though it was done with tight time constraints. His office insured a careful concordance for

previously recorded sites and those identified during the 1981 field survey.

Jeffrey Miller made a special trip from Los Angeles to accompany us for one day on the Bear Creek Reservoir survey. He had a great deal of information on the location of many sites, especially the rock art loci. We are very appreciative of his interest and help.

Perhaps one of the more important persons involved in the report compilation was our tireless Office Manager, Lori Lyford. She ran innumerable errands, coordinated the work flow, and typed several drafts, all site survey forms, and two of the Final Reports. She has somehow retained her sense of humor throughout the months of work. Without her diligence, the final product could not have been achieved.

To our typists, Carol Larsen and Teresha Legatos, who produced three of the Final Reports, we give our deepest thanks.

Finally, we wish to thank the landowners who gave us information on access roads and on resources within their property. To all other persons who provided information, opened archives, and otherwise assisted, please accept our gratitude.

CONTENTS

	Page
ABSTRACT	11
ACKNOWLEDGMENTS	111
INTRODUCTION	1
SCOPE OF WORK	2
Purpose	2
Project Description	2
Research Design	5
Description of Report	5
BACKGROUND SECTIONS	7
Environmental Background	7
Archeological Background	10
Ethnographic Background	13
Linguistic Prehistory	14
General Historic Background	17
Site-Specific Historic Background	19
Research Design: Prehistoric	21
Research Design: Historic	24
1981-1982 SURVEY METHODOLOGY	26
SURVEY FINDINGS	29
CONCLUSIONS	37
IMPACTS	46
Introduction	46
Impacts	47
EVALUATION OF SIGNIFICANCE FOR NATIONAL REGISTER OF HISTORIC PLACES	53
MITIGATION/PRESERVATION	58
Prehistoric Testing Rationale	59
Historic Testing Rationale	62
Downstream Borrow Area	63
Reservoir Zone 1: Elevation 351' to 380'	63
Reservoir Zone 2: Elevation 381' to 410'	64
Reservoir Zone 3: Elevation 411' to 440'	67
Reservoir Zone 4: Elevation 441' to 469.5'	69
SCHEDULE FOR LIMITED TESTING	74
Prehistoric Sites	74
Historic Sites	77
REFERENCES	78
GLOSSARY	84
LIST OF PLATES	89

APPENDIXES

1. ETHNOGRAPHY, ETHNOHISTORY, AND HISTORY OF THE MERCED COUNTY STREAMS PROJECT AREA	125
2. INTERVIEWS	167
3. AUGER TESTING	185
4. CONCORDANCE OF FIELD NUMBERS AND PERMANENT TRINOMIALS	193

TABLES

1. List of Resources	34
2. Suitable Sampling Area of Midden	36
3. Probability and Duration of Inundation	48
4. Recommendations for Nomination	60
5. Testing Recommendations	70
6. Priority of Mitigative/Protective Measures	72
7. Phase 1 Prehistoric Testing Procedure Estimated Field Hours	76
8. Phase 1 Historic Testing Procedure Estimated Field Hours	77

FIGURE

1. Cultural Chronology	11
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MAPS

1. Project Vicinity Map	3
2. Drainages and Ethnographic Territories of the Project Vicinity	15
3. Bear Reservoir Site Location Map	Back Pocket
4. Bear Reservoir Borrow Pit Impact Area	Back Pocket
5. Bear Reservoir Downstream Borrow Pit Area	Back Pocket
6. Bear Reservoir Inundation Zone Map	Back Pocket

INTRODUCTION

An intensive cultural resource survey was conducted within the boundaries of the proposed Bear Dam modification and reservoir enlargements. This study was conducted as a part of the Merced County Streams Project (Map 1), which is primarily a flood control project proposed by the U.S. Army Corps of Engineers. The entire project would consist of the enlargement of Burns and Bear dams, the construction of Haystack and Castle dams, and downstream channel improvements. The purpose of the project is to temporarily store runoff behind ungated dams to prevent downstream flooding. There would be no permanent pools. The cultural resources survey was ordered in accordance with Executive Order 11593 and Public Law 93-291, which requires that all cultural resources, which may be affected by a proposed project with federal involvement, be identified, inventoried, and evaluated for eligibility to the National Register of Historic Places.

The reservoir area and the zones of the two borrow areas had been surveyed before for cultural resources, with 11 sites located within the reservoir impound and one near the edge of a borrow area. The site records were incomplete, lacking certain descriptive and metrical data on the resources, and it was believed that other cultural resources might be present or that the identified sites might be more complex than the report (Clewlow 1976) indicated.

The present design will increase the existing gross pool elevation from 414 to 469.5 feet. The total acreage which will be involved in the damsite, spillway, and the reservoir impound will be 836 acres. Two borrow areas totaling 30 acres are located downstream from the dam.

The impacts will derive primarily from two sources: quarrying of construction materials, and inundation (wave action erosion). Other impacts due to inundation may have to be considered.

Evaluation of the significance of each resource was predicated upon its potential to address pertinent regional research questions. The assessment is based upon the surficial evidence, both artifactual and eco-factual. The limitations inherent in a cultural resource survey are recognized.

The mitigation alternatives proposed are based upon the nature of the resource and the nature of the impacts. The degree of impact to be expected from ungated flood control dams, in comparison to the more studied gated dams, is a question which has not been directly faced before, to our knowledge, and our recommendations are predicated with this difference in mind.

The ethnohistoric and historic research has been undertaken by an ethnohistoric consultant and a historic researcher. The ethnohistorian's duties consisted of establishing a liaison with concerned Native American groups, soliciting their knowledge concerning culturally important resources in the project area, conducting primary source archival research and interviews both on the Native Americans and the later ethnic groups of the historic period, the settlement systems, notable personages, and subsequently incorporating this knowledge into a comprehensive report. The historic researcher helped in the archival research and the interviewing of consultants.

Prior to the field work, the principal investigator and the ethnohistorian met with the American Indian Council of Mariposa County to determine if they knew of any Native Americans who had knowledge pertaining to the project area. They also suggested a number of Native Americans who would accept a position as an observer. The individual who accepted proved to be a valuable member of the crew, and he provided insights into the interrelationships of sites and features.

SCOPE OF WORK

Purpose

In accordance with Executive Order 11593 and Public Law 93-291, all cultural sites which may be impacted by project construction will be located, inventoried, and evaluated for possible nomination to the National Register of Historic Places. The purpose of this work is to intensively survey and inventory the cultural resources at the proposed Bear, Castle, Burns, and Haystack reservoirs and the downstream channel improvements, Merced and Mariposa counties; evaluate all sites for National Register eligibility; and prepare a plan for possible mitigation and preservation actions.

Project Description

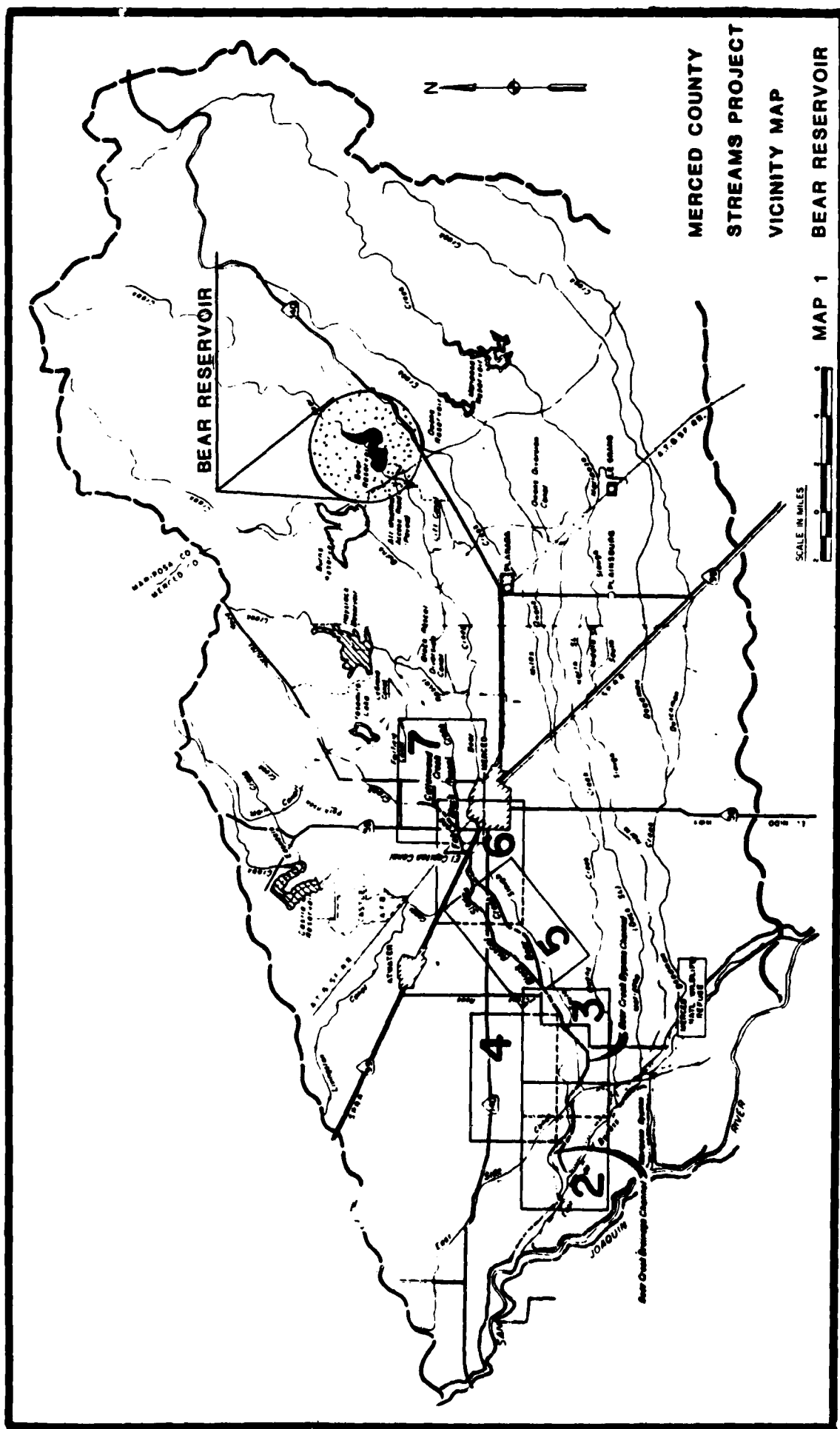
The project will consist of (1) two new detention dams (Castle, Haystack Mountain), (2) enlargement and modification of two existing detention dams (Burns, Bear), and (3) about 17 miles of levee and channel modifications.

As designed, the Bear Reservoir area will consist of approximately 836 acres, to include the dam and spillway, reservoir pool, borrow areas, and access roads. Castle Reservoir will consist of about 859 acres, including the dam and spillway, reservoir pool, borrow areas, access roads, and dikes. Haystack Reservoir will consist approximately of 452 acres. The spillway, the bottom of the dam, and the access roads will increase the acreage to 510 acres. The renovation of Burns Dam will increase the gross pool acreage to 2,179 acres. Associated structures will increase the acreage to 2,310 acres.

MERCED COUNTY
STREAMS PROJECT
VICINITY MAP

MAP 1

BEAR RESERVOIR



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Research Design

The Contractor will be responsible for preparation of a research design. The Contracting Officer will review and approve the research design prior to its implementation.

The general overall research design in the Technical Proposal shall present the research needs or problem domains the Contractor anticipates accomplishing under this solicitation. Contractors should include, as a minimum, information on the types and extent of study and analyses estimated to be necessary to fulfill these research needs. Archeological, historical, ethno-historical, and architectural aspects must be addressed. The Contractor's proposed overall research design will be organized into separate sections for prehistoric archeology, historic archeology, and cultural anthropology. The accepted overall research design may be reviewed, revised, and/or modified, as necessary, during the conduct of the program.

Description of Report

Prepare five separate and complete reports, one for each reservoir and the downstream, cultural resources intensive survey reports on the effects of the projects on archeological and historical resources at Bear, Castle, Burns, Haystack, and the downstream areas, by accomplishing the following:

Peak and Associates will review previous cultural investigations pertinent to the project area. The review should include a statement summarizing all known cultural sites, their locations if close to or within the project area, and findings from previous surveys, investigations, and ethnographic and historic background statements. Sources for the archival review shall be fully identified and shall include, but not be limited to, county records, the records of the State Historic Preservation Office; the California Archeological Sites Survey Regional Office, Stanislaus; the National Register of Historic Places; the California Historical Landmarks; "Final Report on the Archeological Reconnaissance of the Merced County Streams Project, California"; and the report, "Cultural Reconnaissance of El Capitan Canal, Black Rascal, Fahrens and Cottonwood Creeks."

Local residents, personnel at public institutions, members of local historical societies, and others who may have relevant cultural resources information shall be consulted. Such persons contacted shall be identified in the report in an appendix.

Consult with local Native Americans who may assist in identifying sites which they consider to be of religious or cultural importance. Identification of persons contacted and the type of information obtained shall be included in the report in an appendix.

Conduct an intensive on-the-ground survey of Bear Reservoir consisting of approximately 836 acres, of Castle Reservoir consisting of approximately 859 acres, of Haystack Reservoir consisting of approximately 510 acres, and Burns consisting of 2,310 acres, and the downstream channel improvements, designed to locate, inventory, and evaluate for possible eligibility to the National Register of Historic Places all sites within those areas.

Prior to initiation of field work, submit a survey plan for approval by the Government. The survey plan will identify intended survey methodology in detail for both historic and prehistoric sites.

Assess each located cultural site for National Register of Historic Places significance and eligibility. Determination of significance shall be defined in regard to National Register criteria, research potential, and possible contributions to local, regional, and national history and prehistory. The basis for evaluation shall be stated explicitly for each site. This information shall appear in tabular form also (see Paragraph 1.8.2 Specifications).

Prepare nominations, using Form No. 10-360, for all historic and prehistoric sites which may be eligible for the National Register of Historic Places. These sites may be considered individually, as a district, or any combination thereof. The level of documentation required for the nomination forms is outlined in the Federal Register, Vol. 43, No. 183, Wednesday, September 21, 1977.

Include a statement as to whether any, and which, sites of previously identified prehistoric or historic significance designated by federal, state, or local government will be affected.

Provide for each located cultural resource scaled, detailed maps showing site composition, extent, presence of midden, and artifact site features such as bedrock mortar outcrops, petroglyphs, historic structures, existing impacts to sites, and the relationship of sites to nearby roads, trails, trees, and other topographic features. Mapping shall be done with surveying instruments such as metric tape and compass and shall be of good quality. Details of other features such as bedrock mortars, petroglyphs, or historic structures shall be fully described and illustrated by photographs (with scale) and line drawings. Separate appropriate feature records for each shall be prepared. Sites previously mapped in the 1978 survey shall not be remapped; however, site records and maps shall be corrected in the event incorrect or additional information is found.

Provide fully completed site survey records for all cultural resources located and prepare a map showing all cultural resources in the project area.

At least three locations for each midden site shall be sampled so that midden depth, composition, and other information useful in determining possible eligibility to the National Register of Historic Places can be defined. The location of these borings shall be shown on site maps. Findings shall be described in an appendix. Information pertinent to National Register evaluation shall be discussed in the main report in the section on "Evaluation of Significance for National Register of Historic Places."

Suggest protective and/or mitigative alternatives for each site. For each site identify the alternative which appears to be most feasible and discuss the basis for the decision.

Prepare time and cost estimates for accomplishing the mitigative and/or protective work. Sufficient detail shall be provided to enable Government review of labor efforts for field and laboratory work, possible special analyses, and other expenditures. The above information shall be provided for each site.

Surface artifactual materials discovered during the course of the survey will not be collected. Any culturally or temporally diagnostic artifacts which are (a) seen in the field but left at the cultural site, or (b) obtained from auger borings, etc., will be photographically recorded.

Identify those sites which should be test excavated (in addition to the three auger samples) in order to determine their significance. Suggest the amount of testing, in terms of 1 x 1 meter excavation units, and describe what variables were used to arrive at that quantity for each site. Prepare a cost estimate for such an effort.

BACKGROUND SECTIONS

Environmental Background

General environmental setting. Although one physiographic region, the San Joaquin Valley displays a diversified environmental pattern: arid foothills on the west, swampy valley floor, gently rolling eastern alluvial plans, and the oak parklands of the lower Sierran foothills. In terms of prehistoric land use, the restrictions or advantages of each area are reflected by the known settlement pattern.

Geologically, the Central Valley is a great geosynclinal trough which has existed from Tertiary times (Hinds 1952). Bounded on the east by the Sierra Nevada massif and on the east by the Coast Ranges, the trough follows a northwest-southeast axis reflecting the strike of the Sierra and Coast Ranges. The southern boundary of the valley is formed by the Tehachapi Range, while the Cascades and the Klamath Ranges rim the

northern extent. The San Joaquin Valley is, in part, drained by the San Joaquin River, which flows west from the Sierra, bends sharply north at Mendota, and trends northwest to empty into the maze of sloughs and marshes of the Central Valley Delta into the Pacific Ocean. The southern end of the San Joaquin Valley is not drained by the San Joaquin River. The area extending from the Kings River to the base of the Tehachapis has no surface outlet under normal conditions of runoff and rainfall. Drainage is into a series of now extinct or controlled playas. The valley floor is a long alluvial plain gently uplifting to dissected fans derived from deposition by the degrading streams of the surrounding mountain ranges. Soils within the valley are generally devoid of natural rock constituents as the coarser materials tend to drop near the head of the fans, leaving the finer silts which carry farther out into the valley.

The San Joaquin Valley lies in the rain shadow of the Coast Ranges, which effectively blocks much of the available moisture. Storms are diverted over the region to deposit their water content on the higher Sierra to the east. As a consequence, the area suffers from a deficient rainfall. The chronic pattern of aridity, apparently one of long standing, is marked on the west side, where few streams of perennial flow are established. Runoff from the infrequent storms is rapid and water disappears within a short period of time. In contrast, the east side, recipient of the captured rainfall and benefiting from the stream flow headquartering in the large catchment basins of the upper Sierra ranges, contains numerous perennial rivers and streams. Erosion is more vigorous, a result of the high annual rainfall, and alluvial fans stretch westward out into the trough. The inequitable runoff has resulted in uneven deposition of sediments with the gradual movement of the axis of drainage far to the west.

The aridity of the west was reflected by the restricted vegetation growth. Arboreal communities were restricted to canyons of perennial streams, with sparse grass cover and some low-growing brush over the hill slopes and fans. The east side, with a correspondingly higher precipitation, had a different vegetative pattern. Oak groves, where adequate water was available, extended out onto the valley floor. Stream channels, sloughs, and lake shores were fringed by cottonwoods, willow, and sycamore. The stretches between stream courses, beyond the percolation limits of ground water, were open grasslands. The low-lying valley trough, with sluggish streams near to grade, supported vast tule marshes and ponds with dense arboreal stands along rivers and streams.

The faunal communities of each environmental zone had a wide range in both variety and number. Waterfowl, attracted by the large, open waterways, swarmed around the ponds and sloughs. Fish, shellfish, and turtles were abundant, while small mammals and larger game were plentiful in marshlands and on the open plains. In all, the San Joaquin Valley provided a rich resource base for the prehistoric population.

Project-specific environmental setting. The existing dam on Bear Creek is near the point where the Sierra foothills adjoin the San Joaquin Valley (Map 3). The study area ranges in elevation from 320 to 470 feet. The eastern side of the valley rises gradually in elevation following the slope of the alluvial fan. There is a marked alteration of the topography where the foothills rise abruptly to a 500 to 600 foot elevation from the fan. The increase in elevation is as much as 150 feet. Below the eroded face of the hills, the terrain is poorly drained, undulating, and cut by numerous creeks.

Bear Creek exits from the hills in a relatively narrow channel bracketed on both sides by steep slopes. The creek valley is narrow (about 1,000 feet at greatest width), with many stretches considerably more constricted. The wider areas are usually related to the mouths of tributary drainages at which terraces or benches have formed.

The exposed lower bedrock is of schists of the Mariposa Formation, which is overlain by softer beds of the Valley Spring and Ione formations west of the dam. The bedrock near the existing dam is composed of dark-colored schists containing myriad inclusions of chiastolite crystals giving the uptilted beds a textured surface. To the east, the tilted bedrock is of dark slate lacking the distinctive chiastolite crystals. Quartz veins are not uncommon within the metasediments.

There is a marked change in the vegetation pattern from west to east, excluding the riparian community along the creek itself. The grass-covered slopes and rounded hilltops are devoid of trees for nearly one and three-fourths miles east of the dam. The lack of oaks on the hills of the western portion of the area is likely due to the edaphic condition of the soils. The residual soils are derived from the overlying Valley Springs, Ione, and Mehrten formations and these seem to be non-conducive to the establishment of oak groves. Past this point, sporadic blue oaks are seen on the hilltops and in the descending rocky gulches which connect with the main creek from this point. The oaks increase in size and number to often form large groves. Associated with the grasses were oats, sunflowers, turkey mullein, tar weed, sticky blue curls, and bull thistle. Buckeye trees were observed near the upper end of the reservoir. The riparian vegetation of the creek consists of willow, cottonwood, black walnut trees, with an often dense understory of coffeeberry, buttonbush, small willow bushes, and blackberry vines. At the pools, there were sedges, cattails, arrowroot, and other water-tolerant plants such as mint and knotweed.

Although Bear Creek is considered to be seasonal in flow, there is a series of large deep ponds along the channel north of the 90° bend where Bear Creek turns to a westward trend. There may have been similar ponds west of this bend, but the stream has been dredged and also scraped for borrow above the dam. These ponds are spring-fed, as tiny trickles of water exit from

the lower ends and flow until they either enter another pond or disappear into the gravels.

Animal life is abundant. Deer, bobcat, and cougar represent the large mammals, and cottontail rabbits and ground squirrels are the most common smaller mammals. Quail, owls, and eagles were seen, as were rattlesnakes and ribbon snakes.

The narrow stream valley does not contain the hog wallow/mima mound (vernal pool), terrain which is associated with the Merced gravels of the fans below the hills. Although there are some gravel terraces within the margins of the stream valley, these do not have the vernal pool relief found in the Pleistocene gravel deposits (Merced gravels, Arroyo Seco pediments) to the west on the valley margins.

Disturbance through gold rush period placer mining and dredging of the channel gravels in the 1930s is widespread (Jeffrey Miller, personal communication, 1981). The evidence of placer mining consists of gravel/cobble piles, cobble retaining walls in gravels, ditches, pits, diversion canals, and eroded terrace faces. The dredging is confined to the areas near the west bend of Bear Creek and downstream from here. Conical piles of cobbles and parallel rows of discarded mined gravels extend along the stream banks and into the channel.

Extensive ground disturbance can be seen in the areas above the existing dam where soil was borrowed for construction. The channel is widened and flattened, with steep cuts along the hill slopes. There are bulldozer cuts and access roads bladed along the north side of the reservoir (impinging on archeological sites).

Other historic disturbance relates to the ranching period and this includes fences, dirt roads, cattle feeders, spring improvements (some water is piped into concrete troughs), cattle trails, and salt licks. The sites are in generally good condition, however, largely due to retention of this property in private lands behind locked gates and posted fences. This has minimized most other types of cultural resource disturbance, particularly vandalism.

Archeological Background

In 1950, Albert Mohr conducted an archeological survey of portions of the existing Bear Reservoir. He briefly reported that there were six insignificant sites which were lacking research potential or the appearance of great antiquity and, therefore, did not warrant further attention (Mohr 1951:7). This report does not discuss the sites in any detail and no site was assigned permanent trinomials.

In 1975, a contract was issued for a more comprehensive archeological survey of the existing reservoir and the proposed gross pool enlargement to 434 feet elevation. The final report states that approximately 100 percent of the total reservoir area was completely sampled and that eight prehistoric and three historic sites were identified during the field work (Clewlow 1976:33-39). As no site survey forms from Mohr's survey were on file at the Regional Office at Stanislaus State College, Clewlow was unable to draw any correlations between his sites and the six found by Mohr (1951).

Fredrickson (1973), as part of his dissertation research on the Coast Ranges, proposed a new chronological scheme for the prehistoric settlement of California. While the majority of his results are not directly applicable to the Sierran foothills province, his revision of the terminology for major temporal units is useful. The previous temporal concept used in California prehistory is the Horizon (see Fenenga 1977). It has proven useful over the years to categorize the various archeological entities uncovered, but it does suffer from a few disadvantages. The primary fault in the concept is its blending of time units with archeological entities--e.g., the Windmillier facies has served both as a time period and as a Delta-based archeological entity, the Early Horizon.

Fredrickson (1973:116) has simply separated these two levels of conceptual categories--i.e., time and archeological entities. Of immediate import to the present report are his temporal units called periods. The dating of them will probably need revision from time to time, probably by region, since cultural developments may proceed in a mosaic fashion. His periods are named for the dominant stage, the socioeconomic level of development. This does not imply that all archeological entities found within one period will be characterized by the same level of socioeconomic development. The periods recognized are the Early Lithic Period, the Paleo-Indian Period, the Archaic, which is divided into two subperiods (Lower and Upper), and the Emergent, also divided into two subperiods. Their correspondence with the older cultural chronology can be seen in Figure 1.

Figure 1

Cultural Chronology		
Upper Emergent	A.D. 1500-A.D. 1750	Phase 2, Late Horizon
Lower Emergent	A.D. 300-A.D. 1500	Phase 1, Late Horizon
Upper Archaic	2000 B.C.-A.D. 300	Middle Horizon
		Intermediate Cultures
Lower Archaic	6000 B.C.-2000 B.C.	Early Horizon
		Early San Francisco Bay
		Early Milling Stone Culture
Paleo-Indian	10,000 B.C.+	
Early Lithic		

This section describing the adoption of Fredrickson's chronological scheme was deemed necessary since the previous chronology is still in use (Fenenga 1977)

Previous work in the project vicinity has consisted of cultural resource surveys and none has produced any temporally diagnostic artifacts (Peak 1975). The assessment of the archeological resources, with the exception of the historic resources, still lacks accurate dating. It is believed that most represent the Upper Emergent or the archeological manifestations of the ethnographic peoples who inhabited the area at the time of contact.

The archeological patterns characteristic of this region have not been adequately defined as yet. Archeological investigations at nearby Hidden Dam (Lake Hensley) could form the basis if the data were adequately studied and published. Bennyhoff's chronology for Yosemite is not considered applicable in this situation where the project area is located on the edge of the foothills and valley, since the settlement pattern and site types can be expected to vary.

The most appropriate available study is for Buchanan Reservoir (Moratto 1972), and it still provides the basic comparative data for other investigations in that portion of the Sierran foothills bordering the San Joaquin Valley. The Madera Phase of Moratto's scheme is in the Upper Emergent culture or pattern of concern here. It has been described many times in the literature and need not be summarized again here.

The Lower Emergent would be represented at Buchanan by the Raymond Phase and the Upper Archaic by the Chowchilla Phase. These two have been well defined by Moratto, and the interested reader is referred to his dissertation. There were no Lower Archaic entities found at Buchanan by his investigations. Later investigations by Peak (1976) recovered temporally diagnostic forms, which indicates occupation occurred during most, if not all, of the Archaic Period. Certainly, Fenenga (1977:35) suggests that occupation at the Hidden Dam Project area encompasses the Archaic, although the extent is not clear.

The Paleo-Indian Period does not seem to have been found in the sites of the lower Sierran foothills, but it has been identified at higher elevations--for example, at New Melones Lake project in Calaveras and Tuolumne counties (Crew 1980). The project area may have been occupied during this period, although the evidence will be difficult to find and may necessitate excavation.

Archeological evidence for earlier periods is more rare. Peak (1981) has recently reported on a lithic industry from the lower foothills near Sacramento which typologically, and perhaps geologically, will have to be regarded as Paleo-Indian or

earlier. Such manifestations were probably not relegated to one region, and similar early resources may be present but buried in the project area.

Ethnographic Background

The Sierran foothills in the vicinity of Bear Reservoir have generally been assigned to the Southern Sierra Miwok (Barrett 1908; Bennyhoff 1977; Kroeber 1925; Levy 1978). Regardless of cultural affinities at the time of white contact, the subsistence base and material culture were markedly similar throughout the foothill region. Neighboring Indian groups within the same physiographic regions, although perhaps of different linguistic families, held more traits in common than with linguistically related stocks in dissimilar zones.

Eastern Miwok territorial boundaries are given as the Cosumnes River to the north, the Fresno River to the south, east to the Sierra Nevada crest, and west to the eastern edge of the Great Valley plains, with an extension onto the plains north of the Calaveras River (Levy 1978). Their area comprised the whole or part of the present political units of Sacramento, Amador, Calaveras, San Joaquin, Stanislaus, Tuolumne, Mariposa, Merced, and Madera counties. The greater part of seven large river drainages is covered by the unit: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, and Fresno (Map 2).

Three major physiographic units are spanned by the Miwok occupation: the high Sierran ranges on the east, the foothills, and a section of the San Joaquin Valley on the west. Climatic variation is extreme, consistent with the changes in physiographic setting.

The severity of winter in the upper elevations of the Sierra Nevada supposedly precluded permanent villages, with aboriginal use of these high areas restricted to summer and fall. Temporary camps within the mountain ranges permitted seasonal exploitation of this rich resource area, with the population returning to the foothill zone below 4,000 feet, where a more moderate winter climate prevailed (Barrett and Gifford 1933).

Settlement was predicated upon topographic variables as well as on cultural selectivity. Canyons are often steep, with few flat lands where villages could be located. As a result, most villages were situated on ridges or terraces above the streams. Available fresh water was a limiting factor to location, although small campsites, established for special purposes, are found with no nearby water sources.

Subsistence was based on the acorn and supplemented by gathering of seeds, berries, greens, nuts, and edible roots. Fish, game, and small mammals augmented the diet. Processing

of acorns required use of mortar and pestle to reduce the nut-meats to meal. Bread and mush were made from the leached meal.

The archeological manifestations of the Miwok are, without doubt, the Mariposa Phase in the Yosemite Valley (Bennyhoff 1956), the Late Phase in the Sonora region with Desert Side-Notched points (Moratto and Riley 1976; Science Applications, Inc. 1979; Peak 1973), and perhaps the Madera Phase along the Chowchilla River (Moratto 1972), although others would disagree about the latter (Peak 1976).

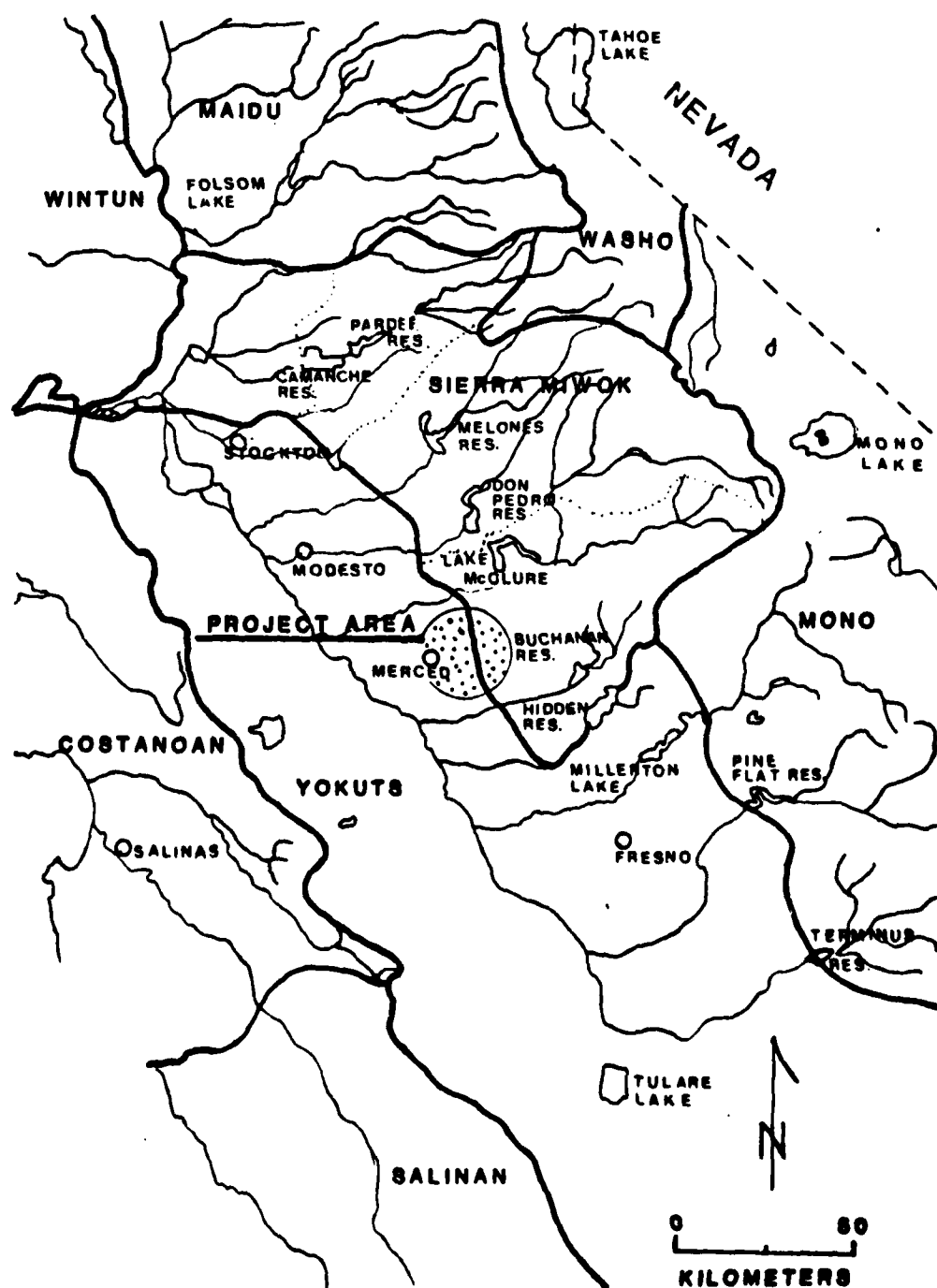
There is a possibility that the region was occupied by the Northern Valley Yokuts. Clewlow (1976) has recently adequately summed up the meager knowledge about them, and the reader is referred to this review for further details. Wallace's (1978) excellent summary is the best general recent review. Clewlow does not mention that their villages were situated on high zones or hills above nearby watercourses (Wallace 1978), and such small rises are apparent on the project map for Bear Reservoir and will have to be thoroughly examined.

Clewlow does note the problem of distinguishing between Yokuts and Miwok archeologically, but Bennynoff's (1977) Stockton District may be applicable for the Yokuts if some differences between the more northerly placed Yokuts are acknowledged. Perhaps a more appropriate "pattern" would be the Panoche Complex (Pritchard 1966; Olsen and Payen 1969) from the west side of the San Joaquin. Little evidence exists of its hallmark trait, the Panoche Point, on the east side of the valley across the San Joaquin River. It was not present along the Chowchilla (Moratto 1972) or in any of the other complexes of foothill sites investigated in the recent past (Peak 1976 would disagree). Perhaps the pattern which typifies this portion of the San Joaquin Valley has yet to be determined for the protohistoric or Late Emergent Period. It may, in fact, be represented by the Madera Phase along the Chowchilla, although Moratto would disagree.

Linguistic Prehistory

Moratto and Riley (1980) presented a hypothetical model of California linguistic prehistory in their research at Balsam Meadow in the Sierra National Forest. The points of the model which need to be emphasized in this study are: (1) California was inhabited primarily by Hokan speakers between 10,000 and 6,000 B.C. The Western Pluvial Lake Tradition (Bedwell 1973) would represent these ancient Hokan populations. (2) Between 2500 and 1000 B.C., there was a movement of Yokutsan groups into the valley, and Sierran foothills from the Delta. The Wind-miller Pattern and the Crane Flat in the Sierra are seen by Moratto to represent this expansion. Pacheco A and B (Olsen and Payen 1969), on the west side of the San Joaquin Valley, may represent another part of this expansion. They will also be present in the foothills by 0 A.D./B.C. as far south as the Fresno River. Moratto sees this later movement as the

DRAINAGES AND ETHNOGRAPHIC TERRITORIES OF THE PROJECT VICINITY



Base map adapted from Moratto 1972, Map II.

MAP 2

Chowchilla Phase. (3) the Eastern Miwok (Levy 1978), including the Plains Miwok, diverged from the Coastal Miwok around the time of Christ. The Sierra Miwok quickly moved south, displacing the earlier Yokuts groups (Moratto's Madera Phase and perhaps the Late Raymond). In Yosemite, the Mariposa phases represent the Miwok. Yokutsan groups are archeologically manifested by large projectile points and a mano/metate system for milling, while the later complexes are distinguished by light projectile points, use of bow and arrow, bedrock mortars, and cobble pestles. Steatite vessels and clamshell disc beads (Moratto and Riley 1980:26) are also part of this late Miwokian repertoire.

Moratto's correlations between inferred linguistic events and archeologically observed changes are based upon similar age ranges attributed to each entity (Moratto 1981). The danger of attributing an archeologically defined entity to a linguistic entity is well known, and extreme caution and thorough research must be employed when doing so.

General Historic Background

The Spanish had little influence on this part of California. Exploration was minimal and had no great effect on the area other than the assignment of such place names as Merced and Mariposa by the Spanish. Moraga and Muñoz came through the area in 1806 but failed to observe any Native American settlements. Other Spanish forays were made into the lower (or northern) portion of the San Joaquin Valley during the early part of the 18th century and nearby Indians were removed to the missions. Land grants were made by the Mexican government in the 1830s and 1840s outside, but near, the study area. Jedediah Smith (and probably others) trapped furs in the 1820s, and John Charles Fremont and Joseph Reddeford Walker explored the region in the 1840s.

The gold rush brought the first real changes to any portion of the study area. In the latter part of 1848, the southern mines opened up in the Tuolumne River area and mining camps were rapidly established in the foothills of what was soon designated Mariposa County. This was one of the original 27 counties and extended from the Coast Ranges to the present Nevada state line. Mining activities greatly altered the landscape and tailings, shafts, ditches, and abandoned stampmills attest to this today.

Initial settlement was primarily along the streams and rivers. Towns formed (e.g., Indian Gulch) early in the gold rush era and miners traveled there for food, supplies, and mail. Quartz mining began in 1849 in Mariposa County, and miners who abandoned placer mining for quartz mining took up residence near their claims.

During the early days of the gold rush, most of the miners were from the eastern and southern United States (later, men from almost every country in the world arrived to try their

hand), and were young and single. Accurate data on the ethnic composition of the population are nonexistent for the early part of the gold rush, but an analysis of the 1857 Assessment Roll for Merced County provides such information for the mid-1850s.

With the exception of a very few Spanish names . . . the names are practically all American of the sort that were brought from England. Swedish, Portuguese, Italian, Greek, and Japanese names, which we have now, are conspicuous by their absence (Outcalt 1925:156).

Italians are reported in the Mariposa (town) area in 1849 (Reynolds in Chamberlain 1972:15) and at Indian Gulch sometime thereafter ("Old Timer," in Chamberlain 1972:153-154).

The only road into the area from the main supply center at Stockton ran east to the foothills, then followed closely the edge of the foothills (to avoid the often impassable wetlands), passing through Knight's Ferry, La Grange, Merced Falls, Union (a post office in the late 1800s located in the Northeast $\frac{1}{4}$ of Section 2, Township 8 South, Range 16 East), Newton's Ferry (on the Chowchilla River), and ending at Fort Miller (later Millerton) on the San Joaquin River.

The quantity of freight hauled on the road was immense, and large freighting businesses were built up. Hundreds of men and thousands of mules and horses (and a few oxen) were employed, and numerous stopping places (usually a ranch, sometimes a hotel, plus stables and corrals) were necessary for over-nighting. The mail arrived once a month and was carried into the Southern Mines by the express service of Reynolds & Company, bought out by Wells, Fargo & Company, which built an office in Hornitos in 1854 (Chamberlain 1972:52).

When Merced County was formed out of Mariposa County in 1855, the Stockton-Millerton Road became the county line, and for many years the bulk of Merced County's residents lived in the area near that line.

The primary activity "creeping out" into the San Joaquin Valley was cattle ranching, and the settlement pattern of the 1850s and 1860s reflects this. The Merced County Assessment Roll for 1857 shows that most of the population was located along the Merced River from Merced Falls out onto the plains almost as far as the San Joaquin River, and along creeks from Burns and Bear to the Chowchilla, here stretching onto the plains about half way to the San Joaquin River.

Gold mining continued in the foothills, but cattle ranching became an increasingly important economic activity from the mid-fifties on. Cattle ranching requires substantial land for grazing, and the early ranchers grazed their stock on the government-owned land, purchasing (i.e., gaining a patent or official conveyance) relatively small (compared to the numbers

of acres actually used) parcels of land. This practice did not continue for more than a few years, as it became necessary for the ranchers to acquire legal right to the grazing land.

The establishment of agriculture proved to be a challenge to the new settlers, as they were unfamiliar with dry farming and had little experience with irrigation methods. However, the knowledge gained through dry land experimental farming in the northern part of the state, the introduction of wheats suitable for the climate, and development of farm machinery allowed large-scale farming.

Farmers moved into the area in increasingly large numbers, gaining patents to the public land and planting grains. Disputes between farmers and ranchers were not uncommon, occasioned by crop damage and/or destruction by cattle. The ranchers insisted that the farmers were responsible for fencing the cattle out; the farmers insisted that the ranchers were responsible for fencing the cattle in.

Cattle were very troublesome, and had to be herded night and day to prevent their encroaching on the fields and destroying the growing grain (Lewis Publishing Company 1892:74).

The ever-increasing farmer population became politically powerful, and in 1874 the "No Fence"--meaning the farmers did not have to fence--law was passed. Cattle ranching continued to be an important industry in eastern Merced and western Mariposa counties (as it is today) partly because the land is unsuitable for wheat farming and partly because the invention of barbed wire in the late 1800s made possible the fencing of ranches at a nominal cost.

Although there have been many significant changes in the eastern Merced-western Mariposa counties area in the past 125 years, there has also been remarkable consistency. The settlement pattern that began during the short-lived gold rush persists on the foothills today, where cattle ranching continues to be the predominant economic activity. The plains, with the aid of irrigation, support numerous crops and have remained, by and large, agricultural. The biggest changes have come along the route of the railroads, where urbanization is concentrated.

Site-Specific Historic Background

Bear Creek Reservoir impacts Sections 22, 27, 33, and 34 of Township 6 South, Range 16 East, U.S.G.S. quadrangles Indian Gulch and Owens Reservoir. Evidence that placer mining occurred in the area is readily obvious by tailings, etc. Evidence that a trading post was set up to serve the miners is not so obvious, but on September 9, 1854, a license was issued to Eccleston and Seely to set up a trading tent four miles south of Indian Gulch,

which would have put them inside the Bear Creek Reservoir area. This may be Robert Eccleston, who had come to California some years before, had mined for a time, and then served in the Mariposa Battalion under Major James D. Savage during the "Mariposa War" (a campaign to bring reluctant Indians in to negotiate a treaty) in 1851. He had moved to Marysville by 1854 (Eccleston diaries, Volume 9, n.p.). He may have been an investor in the trading post rather than an active, working partner.

The first patent for Bear Creek Reservoir land was obtained in 1867 by Robert Simpson, Jr. There was much selling back and forth of property in the early 1870s, and large ranches began to form in the late 1870s. The Grade, Cunningham, Ryan, and Pate ranches, for example, are all shown on the Official Map of Mariposa County for 1897.

William A. Grade, a pioneer merchant of Mariposa, began buying ranch lands to the north of Bear Creek in 1877, eventually acquiring:

. . . 10,000 acres of land in Merced County, where he raises cattle, hogs and sheep. At one time he devoted his time to the culture of cotton, planting 200 acres to this produce; he realized 400 pounds to the acre, for which he received thirteen cents a pound (Lewis Publishing Company 1892:2504).

Grade began leasing his land to D. I. Waltz, who bought the ranch from Grade's son in 1925. The Waltz Ranch is shown on the most recent U.S.G.S. 7.5' quadrangle, Haystack (1962).

Cunningham Ranch was to the south of Bear Creek. The Ryan Ranch was owned by James and Louisa (Pate) Ryan. The barn is still standing and is visible from Highway 140 (Pinkerton 1981).

Francis Marion Pate had come to California in 1849, mined "with indifferent success" for six years before he began farming and raising stock (Elliot and Moore 1881:122). He settled on one quarter section and later bought it under preemption rights. He purchased 3,000 more acres which his son, Stephen M. (Doc) Pate, later bought, adding an additional 1,000 acres (part of the Bennett Ranch). Here he raised mules, horses, and sheep until 1917, when he sold part of the property and moved to Le Grand (Outcalt 1925:526-528).

Bear Creek may have served as a route to the Agua Fria area during the 1870s.

If one, coming from Agua Frio (sic) after delivering many hogs to the thousand Chinese miners who still clung to the placer man's pan, wanted to get to the Stevenson ranch, he might follow Bear Creek down from the hills, and

having come to the plains, see off through the mirage of summer a clump of trees. . . . (Merced Evening Sun 1922).

At this point in time, it is impossible to determine the time at which the stone structures within the reservoir area might have been built, other than to say probably quite early as part of the gold rush activity. Structures of stone or adobe came to be built chiefly in response to the danger of fire, and the materials used and the method of construction varied according to materials available and the cultural background of the builder. Schist, which fractures into horizontal slabs easily and requires little, if any, dressing, was readily available in the project area and was used by the Italians--the "stone masons par excellence" of the gold field--to construct schist and mud mortar structures (Heizer and Fenenga 1948:93, 94; Fenenga, personal communication, 1981).

Coursed rock walls are usually attributed to the Chinese, but upright slab "walls" or enclosures are not known to exist outside the Bear Creek area, and their source and use are unknown (Fenenga, personal communication, 1981).

The Cranes, Cornetts, and Chases further consolidated land holdings in the area in the early decades of this century. Harry Chase--e.g., bought Pate out in 1917--and the Chase Ranch is still shown on contemporary maps. (For readers' additional information, see Appendix 1.)

Research Design: Prehistoric

The conceptual basis for the research design proposed by Peak and Associates for the intensive Cultural Resources Survey and Evaluation of the proposed Bear Reservoir enlargements, Merced County Streams Project, is presented below.

Research designs are conventionally regarded as structured by three hierarchical levels. The highest order level (Level 1) is the theoretical premise or paradigm upon which the research design is based. The most popular paradigm today is cultural materialism, which simply asserts that human behavior, at least in a statistical sense, is based upon economic decision-making. This forms the basis for the research design. Use of the concept that people make rational economic designs supplies a causal factor missing in the use of Systems Theory as the conceptual basis (see Clewlow 1976). Systems Theory is viewed in this regard as a subparadigm which is useful in conceptually structuring the relationships between different components of the entities being studied.

The second hierarchical level (Level 2) within a research design postulates a set of orderly questions about general human behavior, structured in terms of the assumptions of the first-level paradigms and how those questions can be methodologically

addressed. This level identifies the kinds of research concerns which can be explored, given the constraints of the project and the nature of the data. Moratto (1981) and Fowler and James (1981) refer to this level as research domains.

The lowest level of a research design (Level 3) is the implementation of the design for the particular project, the research strategy. It consists of the specific research questions to be considered and how they will be addressed by the data recovery techniques, including research and interview as well as direct field inspection.

The very limited kinds of data available from a cultural resource survey, as opposed to excavation, limit the research concerns or domains (Level 2) and/or questions (Level 3) which can be confronted. Thus, the major function of a cultural resource survey or reconnaissance is to identify the kinds of resources present and how they might potentially contribute to the exploration of higher order research concerns and/or particular research questions.

Archeological research concerns can be generally divided into four areas: (1) cultural change, (2) subsistence and settlement, (3) cultural and social interactions, and (4) paleodemography. Numerous research questions can be generated from any of these research concerns. Below are presented a number of examples generally selected to reflect those questions which can profitably be addressed by investigations in this region.

Research Question 1. If indeed, as Moratto believes, the Yokuts preceded the Miwok in the foothills, then two settlement systems may have been operative. First, if the populations of the valley and foothills were resident in either territory, then the permanent village with its subsidiary hamlets should be archeologically perceivable prior to the Late Period. In other words, sites with earlier components should be in the same locale as the later components and the respective artifact inventories should appear similar, although varying in particular detail (see Elston et al. 1977 for a similar postulation for the Martis and Kings Beach complexes).

If the settlement systems were different in the earlier period--e.g., the Yokuts practiced transhumance--then the settlement system in the project area will appear incomplete. Seasonality studies will reveal gaps in the yearly cycle. Certain artifact types may be scarce or absent, if the resources associated with their use were distant. A thorough study of the resource potential of the environment would reveal a lack of carrying capacity for a year-round subsistence cycle for a hunting and gathering society.

Research Question 2. Moratto et al. (1978) have postulated that there was an arid interval between A.D. 700 and A.D. 1200 which severely affected and disrupted the social, economic, and demographic relations and structures at that time. Large nucleated villages of a permanent character were replaced by smaller villages of much less permanence. If so, then sites with Eastgate Expanding Stem and Rose Spring Series points will be absent or scarce and confined to small camps of transitory nature. If not true, then such sites should not reveal any sudden disruption of the settlement system. Although changes may take place, they may be distributed over a longer period than that postulated by Moratto et al. These changes may not be correlated with the proposed arid interval in any significant degree. The finding of temporally diagnostic forms will be important in addressing this research question as well as observation on site size, artifact density, associated facilities, etc.

The major argument is not whether any arid intervals have occurred in the last 2,000 years but, rather, to what extent they affected human occupation. If the evidence from the work on the west side of the San Joaquin has any significance, the effects of the postulated arid interval may have had a mosaic rather than a general effect (see Olsen and Payen 1968; Pritchard 1970). Any evidence, pro or con, for the settlement of this part of the valley during that period will be a plus.

Research Question 3. Ericson (1977) has postulated that the Sierran quarries were not systematically exploited after A.D. 500. These quarries apparently supplied most of the obsidian upon which the bifaces in the Central Valley, during the period prior to A.D. 500, were created (Jackson 1974). The quarries were not abandoned, of course, but the extensive quarry operations ceased and local peoples simply picked through the old debris. In the summer, when they moved into the Sierra, they traded it to other peoples in the foothills. Gayton (1948), for example, records that the Mono traded unfinished obsidian blades to the Yokuts.

If Ericson is correct, the sites with artifacts diagnostic of the period prior to A.D. 500 should reveal evidence of biface importation--i.e., either bifaces or large bifacial thinning flakes (BTFs) struck from them. Later occupations will demonstrate much smaller BTFs and, when sourced, they may not be from the Sierran quarries.

Research Question 4. As is clear from Clewlow's (1976) brief summation of the Yokuts' literature and Wallace's (1978) more comprehensive survey, the settlement system practiced by the Yokuts in the ethnographic past is relatively unknown. The presence of the Miwok to the east would obviously preclude any transhumance into the Sierra except prior to the postulated movement of the Miwok into those areas. The Yokuts on the east

side would have to exploit the resources in the Central Valley and the adjacent lower hills. The region was described by the Spanish as extremely rich in game and resources, so a stable subsistence base was eminently practical. We postulate that the Yokuts groups maintained permanent villages, organized around a subtribe affiliation, which were socio-politically related to other villages within the dialectical tribal territory. Those villages were surrounded by subsidiary hamlets. Wallace (1978) notes the village plan of the Northern Valley Yokuts was not as organized (rigid?) as with the Yokuts groups to the south. Archeologically, a large site will be surrounded by smaller sites which have a tool industry indicative of a range of tasks--i.e., the hamlets will have an industry similar to the villages but in less quantity. Special purpose sites will have more specialized industry with fewer tool types. The pattern should differ from that of earlier periods.

Bear Reservoir lies near the boundary of Yokuts and Miwok. If the Yokuts occupied the area, large sites will be surrounded with smaller sites, but an intensive analysis will not recover any evidence of transhumance.

If the area was Miwok, then some evidence of transhumance will be present. If Yokuts, the artifact inventory should conform to Bennyhoff's Stockton District or Olsen and Payen's (1968) Panoche Complex. If Miwok, the Madera Phase is probably the most likely archeological manifestation (Moratto 1972). The Mariposa Complex would seem to be primarily indicative of the Yosemite region.

Other research questions, based upon research domains such as demography, are possible but, given the limitations of a cultural resource survey, they cannot be easily addressed. The list presented is by no means regarded as inclusive, as new insights will undoubtedly generate others, and others will be generated from a closer scrutiny of the ones presented.

Research Design: Historic

The early exploitation of the gold-bearing placer deposits in nearby gulches and stream channels caused an influx of miners into this area as well as into other zones of the Sierra Nevada foothills. The first settlement was along the streams and rivers with the early formation of towns and camps (Appendix 1). In the early days of the gold rush, the predominant groups were from the eastern and southern United States, while men from nearly all other countries joined the search for the valuable mineral resource somewhat later.

As the placer deposits were mined out, the inhabitants dispersed to other areas to continue their quest for the gold, leaving behind the havoc wreaked upon the land and sometimes the remnants of their dwellings. In the case of Bear Creek,

these structural remains are still standing with some associated features.

With the cessation of placer mining, the hard rock mines were opened to extract the gold from quartz veins. None of these veins is discernible in Bear Creek, nor are any hard rock mines shown in the immediate area although two are shown within $1\frac{1}{2}$ miles (U.S.G.S. Indian Gulch topographic map). Later land use was oriented toward sheep and cattle ranching and, by 1867, this was firmly established on Bear Creek lands (Appendix 1). In fact, cattle grazing is the primary economic use of this drainage today.

Research concerns which can be addressed are formulated on the historical research data base.

If indeed the structures on Bear Creek are related to the gold rush era, artifacts contained in trash dumps and perhaps in privies may be dated to that time period. As these have been suggested as camps which had a short time span of occupation, trash dumps should be shallow. Artifacts such as bottles should be from only one time period and not show a time succession. If there are deep trash deposits containing artifacts from several time periods, then these camps sustained a long-term occupation rather than a very transitory one. Concomitantly, the occurrence of datable artifacts from more than one time period may also suggest a tenancy of a substantial nature.

As ethnic groups from many countries were involved in mining, these men brought skills from diverse native origins. If more than one ethnic group was involved in the mining, dwelling remains may show a diversity in the construction types and modes. These might be in the size of the cabins, use of mud mortar, fireplaces (shape, size), and use of dressed stone. Discernible differences, especially if confined to one camp spot, may be related to a particular ethnic group.

As a trading post for merchandise and liquor appears to have been located by 1854 in the Bear Creek area, the building constructed to house this activity should be of a type different from those designed for shelter. The license issued in 1854 specifies a trading tent, but this may have had a stone foundation and possibly a fireplace. If a trading post was present, it should be large, with possibly two or more rooms. If the liquor was sold over a bar, there might be evidence of this activity in a trash dump containing greater numbers of bottles than other sites.

Grazing use became the principal land use in the 1860s, and structures related to this activity would be expected to be different from those of the gold rush era. Structures should be more substantially constructed since a long-term use would be expected. Full wall-high buildings or those with subsurface remains could reflect the early ranching period.

1981-1982 SURVEY METHODOLOGY

The cultural resource survey of the project areas for the Merced County Streams Project was intensive and designed to locate all cultural resources, regardless of size or significance. The major purpose of the cultural resource survey was to supply the Corps of Engineers with sufficient information and documentation to permit viable management planning for the resources within the project area.

As a part of the background research, pertinent literature was reviewed as well as the reports on previous surveys conducted for the Merced County Streams Project (Mohr 1951; Clewlow 1976; Wilson 1978). No site-specific record search was requested for the reservoirs since the records on identified cultural resources within the project areas were provided by the U.S. Army Corps of Engineers. Maps and files were examined at the Office of Historic Preservation for information on archeological sites which are in areas adjacent to the study area. A zone from a lower elevation of 125 feet to 800 feet and extending north of the Merced River from Owens Reservoir was delineated since sites within that belt would be topographically and environmentally comparable to the study areas.

As expected, few sites have been recorded within this zone beyond those identified by Clewlow's 1976 surveys. Joe L. Pope (personal communication 1982) stated that no other systematic surveys have been conducted in this region, which accounts for the low number of recorded resources. It is certain that sites of all types occur within this zone but to date have not been recognized and recorded.

Excluding all sites which have been identified in the present study area reservoirs and those at Owens, Marguerite, and Mariposa reservoirs (Clewlow 1976), there are four petroglyph sites within the selected zone of record review. The three other known sites in this zone appear to be habitation sites. Of these sites, CA-Mer-214 is geographically closely related but downstream on Bear Creek from Bear Reservoir. The site record form suggests that this site was probably a large village as over 200 bedrock mortar pits and two possible housepit depressions were noted.

The surveys at Owens, Marguerite, and Mariposa reservoirs were designed to sample the gross pool acreage and were not intensive in nature (Clewlow 1976). Sites recorded at Owens Reservoir include six bedrock mortar loci and one historic foundation. At Marguerite Reservoir an historic foundation and an isolated metate were the only resources found. At Mariposa Reservoir there are seven historic and nine prehistoric sites, of which one is a midden/bedrock mortar site and eight are bedrock mortar loci. The seven historic remains include mud

mortar and slab foundations and chimneys probably related to the early mining era (Clewlow 1976). There is little comparative information since the site record forms do not contain details of construction mode or any illustrations of the historic features.

It is difficult to determine what prehistoric settlement system is present since the surveys were incomplete. More prehistoric sites may be found in these reservoirs should an intensive survey be conducted and a system or pattern might be defined.

An examination of the National Register of Historic Places and the monthly supplements revealed that no sites on or found eligible for the Register are located in or within the immediate vicinity of the project area.

In the field phase the project area was surveyed by 10 to 15 meter transects, depending on the terrain. Known and mapped locations of previously recorded sites were examined carefully. Coverage rate was predicated on 30 acres a day per person, since this insured a thorough examination of likely areas. The downstream borrow areas were surveyed by one person.

The field crew consisted of 11 to 12 professionals organized into three teams of two or three people, each under one crew chief. The Field Director was in charge of one crew but also supervised and delegated the daily tasks to the crew chiefs.

As soon as it became apparent that there was a far greater number of cultural resources than the previous work had indicated (Clewlow 1976), the crews were assigned specific tasks. One team, under the direction of the Field Director, completed the field survey, gave temporary numbers to the sites, and plotted these on the appropriate maps. One team was given the task of recording and drawing scaled illustrations of the petroglyphs. The remainder of the crew was divided into two teams. One was designated as the historic recording crew, while the third group undertook the recording of prehistoric sites and features, excluding rock art. Upon completion of the field survey, team members were reassigned to recording teams. The previously recorded sites were relocated and treated in the same manner as a newly identified site.

Scaled maps were prepared for all sites with a compass and tape, or a transit and stadia rod if the situation warranted. The surface was carefully examined for artifacts and those noted were flagged. All artifacts found were then plotted on the map, but only temporally diagnostic artifacts were illustrated. Boundaries were established by how far the lithic scatter or midden extended. All sites were augered to determine if any subsurface cultural deposits were present. A cultural deposit in this context is defined as an artifact-bearing soil, not

necessarily an organic midden. The auger holes were excavated with an auger, if possible, or with a shovel if the soil proved to be very rocky. The excavated soil was carefully examined for artifacts but was not screened. All auger holes were back-filled when finished. They were excavated to sterile, to bedrock, or as far as the auger could effectively reach.

Due to the large quantity of sites and the complexity of many of these, one crew member who had considerable experience in photography was assigned as photographer. The sites were photographed in the environmental setting in black and white. All features and other pertinent artifacts were also photographed. Particular attention was paid to bedrock mortar loci, petroglyph panels, and surface artifacts of a possible diagnostic character. Color slides were made of particularly important or unusual sites--in particular, rock art panels.

The resources were recorded on the approved site survey forms and their location was plotted on both the appropriate U.S.G.S. quadrangles and the Corps of Engineers design maps of the proposed reservoir. The isolated artifacts found were plotted by the crew on their field maps. At the end of the day, the crew chief plotted them on his/her map and these data were then conveyed to the Field Director. A series of symbols was devised to represent the types of artifacts found, as well as their context.

Prehistoric sites were classified according to the presence/absence of the following elements: bedrock loci (B), midden (M), petroglyphs (P), housepits (hp), and lithic scatters. Historic elements recognized were buildings/foundations, walls, rock fences, trash, mining operation, ditches, dams, and ovens. More recent features (fences, dirt roads, troughs, and trash dumps) were noted.

In the prehistoric classification, bedrock mortars, midden, or petroglyphs can be a site or an element of a site. Housepits are usually an element associated with middens. A site with more than two elements is a complex site. A prehistoric site with an historic component will usually be regarded as a complex site, but not in all cases, especially if one other element such as a disturbed midden is only weakly represented.

Historic sites were mapped, with each associated unit individually drawn and described. Efforts were made to discern trash pits and features. Several sites contain both prehistoric and historic components. If sufficiently complex, an overall map was made, with the prehistoric area also separately mapped--e.g., CA-Mrp-615, Loci 1 and Loci 2.

SURVEY FINDINGS

The 1981 cultural resource survey of the Bear Creek Reservoir (Map 3) and downstream borrow areas (Map 5) re-recorded 10 of Clewlow's sites (1976) and identified 21 additional resources (Map 3). Of the 11 previously recorded sites, only CA-Mrp-404, a metate slick on an isolated boulder, was not re-recorded as close examination showed that it was a naturally polished rock. In order to adequately describe the 31 archeologic and historic sites, they have been categorized by their predominant characteristic--e.g., midden site--although one other type of feature, such as housepits, may be present. As many of the resources have multiple features, any site which has three or more features is classified as a complex type, and their components often include both prehistoric and historic elements (Table 1).

There are 11 bedrock mortar stations which have no associated midden or cultural debris. The bedrock mortar sites are not restricted in location to the stream banks although the majority are situated near Bear Creek (Map 3). Some of the sites classified as bedrock mortar stations may once have had associated midden or other features but there has been extensive historic alteration within the area, particularly in the lower part of the reservoir. Midden may have been removed, leaving only the bedrock feature. CA-Mrp-409 (Plate 1a) is the most likely site to have once had a midden area.

The mortar pits are ground into the flatter surfaces of exposed bedrock and large boulders. Mortar shapes vary from round to oval, although the round outline predominates. The bottom is generally a rounded conical, but there is a large number of flattened round interior bases, suggesting that unmodified round-end cobbles were employed as the pestles in these.

There are mortar pits which are 50cm in depth, which is unusually deep. Thirty centimeters is normally considered a deep mortar cup. This depth may be a direct result of the soft character of the slate bedrock.

There are many instances where small shallow pecked pits occurred with the bedrock mortars and these are probably acorn anvils or even incipient mortars rather than "cupules." These small pits are in close proximity to the bedrock mortars and on flat surfaces. However, true cupules do occur on boulders at several sites and are very common at CA-Mrp-600. The definition of cupules, as opposed to anvils, is made by: (1) the location of these small pits on steep faces, (2) narrow edges of boulders, or (3) as isolated features away from bedrock mortar pits.

Isolated bedrock mortar loci may be found wherever there is exposed bedrock which has flattened surfaces. There is no other pattern to the distribution, as isolated bedrock mortar sites were found near small drainages, on hill slopes, near oak groves, in grasslands, on Bear Creek, and on flats. The number of mortar pits ranged from a single cup to 30, although a low number is the more usual occurrence.

Although petroglyphs occur at 10 loci, only CA-Mer-237, CA-Mrp-606, and CA-Mrp-607 are considered as petroglyph sites. CA-Mrp-606 is located on the east bank of Bear Creek (Map 3) in an area which has sustained extensive mining impact and consequent massive rearrangement of the original terrain. Whether there were other associated features besides the recorded bedrock mortar cup is a moot point. CA-Mrp-607 is also in a heavily mined zone along the creek and may also have once been a more complex type of site. CA-Mer-237 contains a single cupule in a boulder and there is nothing to indicate that there were additional features.

Three midden sites--CA-Mrp-407, -408, and -611 (Plate 13)--were identified. CA-Mrp-407 (Plate 2a) and -408 have associated bedrock mortars, while CA-Mrp-611 has seven well-defined house-pit depressions which range from 3.5 meters to 5.5 meters in diameter, with the deepest one 30 centimeters (cm) deep in the center (Plate 13b). The midden sites are moderate in areal extent, varying from 35 to 55 meters in maximum dimension. The midden or cultural deposit is shallowest at CA-Mrp-408, where the deepest auger test (AT) reached 45cm, and deepest at CA-Mrp-407, where one auger hole reached 90cm.

The nine sites which constitute the complex category display considerable variance in the component elements (Table 1). Prehistoric aspects include bedrock mortars, metates, grinding slicks, middens, housepits, petroglyphs (pecked curvilinear and rectilinear elements, and cupules), and lithic scatters. The older historic constituents include rock building foundations, walls, fireplaces with chimneys, ovens, quarries, dams, ditches, placer mining tailings, upright stone slab enclosures, and retaining walls. Of more recent vintage than the gold mining era are dirt roads, cement troughs, wells, pipes, fences, salt licks, and post alignments. Four of these complex sites are very extensive, not only in areal dimensions but in the range of components. CA-Mrp-402 (Plates 7 and 8) contains 68 petroglyph panels (with some elements over 1.5 meters high), 1 bedrock mortar loci, two midden areas (one lobe of which is heavily disturbed), a lithic scatter, historic placer mining tailings, ditches, trail, and walls.

One midden component of the site lies near the petroglyph complex on the east terrace overlooking the large pond, with the second disturbed lobe 48 meters to the north. The large (33 meters by 21 meters) lithic scatter is slightly east and between the midden areas. The undisturbed midden covers 462 m² and is a 55cm deep dark-brown friable soil. The second lobe is obviously

the heavily impacted remnant of a once extensive village site. The large ditches and cuts produced by placer mining show midden on the side walls, but even the tops of these areas have holes and cobble piles. The area defined as midden has only 30cm of cultural deposit over sterile gravels. This entire zone appears to have had soils removed and there are shallow ditches, holes, and other evidence of mining.

CA-Mrp-615 (Plate 14) contains a large historic component of five structural remnants of mud mortar and slate slab construction, upright slate slab enclosures, a quarry, ditches, placer mining tailings, dams, and graffiti. There are two prehistoric midden loci (1 and 2), of which Locus 2 has over 110cm of midden depth. Locus 1 has 11 bedrock mortar loci, cupules, and a petroglyph panel. Locus 2 has 14 bedrock mortar loci and four possible housepits as associated features.

Locus 1 is on the north side of Bear Creek with a midden area of 2,940 m² and 95cm of depth. There is some historic disturbance from the building of the slab fence on the northern area but, in all, there is not extensive alteration.

Locus 2, on the south side of the creek, also has a defined midden mound covering 3,080 m². Here the base of the midden was not reached by the auger at AT1, which penetrated the soft friable midden to 110cm. No color or textural change was discerned and it is estimated that at least 1.5 meters of deposit is present. The site is remarkably well preserved, with a small trail the only observable disturbance except for rodents.

CA-Mrp-612 (Plate 15) is another large site with four historic structural remnants (Plates 15b, 16a, 16b), ditches, a dam, a quarry area, placer tailings, and dry-laid rock walls. Although the prehistoric midden is quite disturbed, there is over 90cm of deposit remaining in one lobe, as evidenced by AT1 (see site map). The associated features include 10 petroglyph panels, 12 bedrock mortar loci, and a lithic scatter. More recent historic impacts are from the dirt access road and a cattle feeder.

Despite the mapped areal extent of the prehistoric part of the site, which encompasses 12,650 m², the degree of disturbance to the midden and the inclusion of stream channel, pond, and bedrock deletes a large portion from consideration as "testable." The site is divided by natural topographic features into three lobes, each of which was augered. Only AT1 revealed a true midden, while the others encountered a brown silt which produced a low yield of cultural materials. In terms of disturbance, it is easy to assess the degree when midden or cultural deposit is stripped or dug to sterile soils or bedrock. Testable midden is 750 m² at Test 1 lobe, 500 m² at Test 2 lobe, and 500 m² at Test 3 lobe.

The most massive complex site is CA-Mrp-610 (Plate 11). The site has 19 bedrock mortar stations and 30 housepit depressions, of which the largest is 10.7 meters in diameter and 50cm deep and may have over two meters of midden depth. The potential midden depth was determined by augering first on the upper terrace to one meter, where there was a slight color and textural change in the soils. AT4 was dug to 90cm on the lower terrace. The soft brown midden overlay a yellow-brown soil at this depth. The upper terrace is a distinct mound over 120cm above the lower terrace. By examining the angle of slope of the natural terrace on the east side of the site it was estimated that over two meters of cultural deposit had accumulated on the upper terrace.

Disturbance is minimal to most of the site. The south edge of the mound appears truncated by either flood waters or wave lapping. East and south of the lower terrace there is extensive ditching, digging, and earth disturbance from placer mining. Ditches are silted in and edges of holes are slumped and eroded, suggesting that these disturbances occurred quite a long time in the past.

CA-Mrp-599 (Plate 3). The mapped site area is very large (40,000 m²) since several scattered historic features and bedrock mortar stations were included in the recording. Above the dirt road the slopes are steep and lack any prehistoric materials. The historic features are related to mining, including an extensive water diversion system. In fact, Map Unit H-2, a dam, is made of midden and contains artifacts.

The prehistoric site has suffered extensive disturbance in addition to the removal of large sections for construction of the dam. Ditches, holes, and general disturbance have impacted areas of the site. No midden was found west of datum, as both auger holes encountered either clay silt or a caliche. The auger hole (AT2) east of datum found 60cm of midden, but no artifacts were recovered. It is difficult to assess whether or not midden was removed from the top of the site remnant. In essence, there is no practical way to determine the former extent of this site without more testing. At this time, less than 4,000 m² of midden area remains to be sampled, and an estimated 30 percent of this has evidence of earlier impacts. This leaves about 2,800 m² which would be suitable for sampling.

CA-Mrp-600 (Plate 4). The prehistoric midden component has sustained an extensive degree of historic disturbance and only a small portion retains any depth of deposit (AT2) which is 64cm over a sterile cobble layer. Even here, the signs of historic

disturbance are obvious as the ground surface is uneven and has peculiar holes and depressions which are not housepits.

Historic disturbance is intense as there are bulldozed areas, a cattle feeder, post alignments, and a road across the midden.

CA-Mrp-604. The last complex site with midden is CA-Mrp-604. The site occupies an extension of the lower terraces of CA-Mrp-610 (albeit heavily disturbed between the site areas) and an upper terrace which is about 2.5 meters above the lower terrace.

The lower area has a well preserved housepit with a surrounding midden depth of 90cm. The compacted midden overlies a dark red-brown soil which was culturally sterile. The intensive mining activity has distorted the terrace to such a degree that a determination on the original size of the site or its former connection to CA-Mrp-610 is now impossible. Approximately 2,000 m² or less is suitable for sampling and some areas within this zone show surface signs of old disturbances.

The midden area on the upper terrace is approximately 1,311 m², with a maximum midden depth of 35cm over slate bedrock. The two housepits are shallow, but distinct, and overlook the lower terrace.

Associated features are five petroglyph panels and bedrock mortar stations.

The remaining two complex sites, CA-Mrp-597 and -614 (Plate 17), are basically petroglyph sites which qualify as complex sites since they have petroglyphs, bedrock mortars, and a historic feature. CA-Mrp-597 has four petroglyph panels, two bedrock mortar stations, and an historic mining ditch. CA-Mrp-617 lies near the upper end of the proposed reservoir and contains 10 petroglyph panels, a bedrock mortar, and an historic wall made of tilted lapped slate slabs.

The five historic sites are very likely related to the early gold mining phase or early homestead era. CA-Mrp-399 (Plate 5), -400 (Plate 6), and -401 (Plate 9) contain the remnants of 12 structures constructed of natural schist or slate slabs and most with mud mortar. All are associated with nearby evidence of extensive placer mining. Site CA-Mrp-609 is composed of a collapsed slab structure with a fireplace. Parts of a cast iron wood stove are associated with the fireplace area. This suggests a construction or use date later than that of the other historic sites, where no metal is incorporated with the fireplaces. Two complex sites also contain similar historic structural remains of stone slabs and mud mortar.

Table 1
List of Resources

Site	Type	Size: Meters, prehis- toric; feet, historic	Bedrock Mortar	Lithic Scatter	Midden Depth, cm	Housepit	Pecked Glyph	Cupule	Foundation	Fireplace	Wall	Oven	Mining	Ditch	Trash	Quarry	Well	Trough	Fence	Road	Dam	Other	Location	Elevation
CA-Mer-237	P	1 x 1.5						x	x	x	x		x	x									Reservoir	370'
CA-Mrp-399	H	900x1800'							x	x	x	x	x	x		x							Reservoir	390'-400'
CA-Mrp-400	H	50 x 175'							x	x	x	x	x	x									Reservoir	410'
CA-Mrp-401	H	427x1066'							x	x	x	x	x	x		x							Reservoir	430'
CA-Mrp-402	C/P	84 x 132'	17#	x	55	68p		x					x		x								Reservoir	410'-425'
CA-Mrp-403	B	5 x 8	x																				Reservoir	390'
CA-Mrp-404	Not a site																						Reservoir	-
CA-Mrp-405	B	3 x 8	x																				Reservoir	380'-425'
CA-Mrp-406	B	20 x 25	x																				Reservoir	420'
CA-Mrp-407	M	25 x 25	3#		90									x									Reservoir	360'
CA-Mrp-408	M	50 x 56	3#		45															x			Reservoir	400'-415'
CA-Mrp-409	B	12 x 20	x																				Reservoir	370'
CA-Mrp-597	C/P	20 x 20	2#				4p																Reservoir	410'
CA-Mrp-598	B	1 x 1	x																				Reservoir	360'
CA-Mrp-599	C	290x200'	6#		70				x			x											Reservoir	400'-469'
CA-Mrp-600	C/P	100x175'	7#		60		3													x	x		Reservoir	400'-420'
CA-Mrp-601	B	5 x 60	x																				Reservoir	460'
CA-Mrp-602	B	1 x 2	x																				Reservoir	390'
CA-Mrp-603	B	1 x 2	x																				Reservoir	410'
CA-Mrp-604	C/hp/P	90 x 205'	11#		110	3	5p						x										Reservoir	430'-450'
CA-Mrp-605	H	34 x 295'									x												Reservoir	460'
CA-Mrp-606	P	32 x 25	6#				34p	x															Reservoir	420'
CA-Mrp-607	P	5 x 15					10p																Reservoir	410'
CA-Mrp-608	B	32 x 32	x																				Reservoir	410'
CA-Mrp-609	H	8 x 10'																					Reservoir	455'

Artifacts were infrequently found on the prehistoric sites, with very few flakes or other cultural items observed during the August survey. However, in December, 1981, there was an abundance of debitage on the surfaces of the sites which were revisited. This difference in frequency of artifact occurrence is due to the improved visibility when the grass was low. Soils were also darker because of the rain and the artifacts were more easily seen.

The debitage is predominantly made from volcanic and meta-volcanic rock, with rare obsidian. Quartz debris and waste is a frequent constituent, although its use has not been documented, as this requires detailed laboratory analysis. Although many of the sites which have a midden component are areally very extensive, the areas which are suitable for data recovery may be much more restricted. The effects of historic disturbance have often severely impacted the cultural deposits to such a degree that testing in the disturbed zones would be fraught with error. Other sites include a midden area with widely scattered associated features. Table 2 gives the area of midden suitable for testing and possible data recovery.

Table 2

Suitable Sampling Area of Midden

Site	Square meters	Depth
CA-Mrp-407	625	90 cm
CA-Mrp-408	2,800	45 cm
CA-Mrp-402	462	55 cm
CA-Mrp-599	2,800	60 cm
CA-Mrp-600	150	60 cm
CA-Mrp-604	2,000	90 cm
CA-Mrp-610	7,500	Est. +2 meters
CA-Mrp-611	2,116	85 cm
CA-Mrp-612		
Lobe 1	750	90 cm
Lobe 2	500	50 cm
Lobe 3	500	50 cm
CA-Mrp-615		
Locus 1	2,940	95 cm
Locus 2	3,080	110cm to Est. 1.5m

CONCLUSIONS

The limitations of an intensive cultural resource survey preclude addressing many research questions, particularly those concerned with the social interaction and demographic research domains. The research domains which can often be addressed within the inherent limitations of the cultural resources survey are those of cultural chronology and settlement system/subsistence practices. Even research questions generated from those research concerns or domains can be addressed only in a superficial fashion since only surface features and artifacts can be used. With these limitations in mind, the results of the intensive cultural resource survey can be presented.

Although Bear Creek is to be considered a seasonal stream, the study undertaken in August, 1981 (a year of short precipitation), found that there are several deep ponds (Plates 7a, 12b, 17a) in the creek channel. These ponds are spring-fed, as water trickles from the ponds even though the rest of the creek is dry. The vegetation is verdant in contrast to the desiccation so prevalent along other sections of the creek and on the hill slopes. The presence of very large introduced fish tentatively identified as carp, in association with smaller perch, blue gill, and catfish, strongly indicates that water is continually present. The large midden sites are associated with the ponds and occupation may have been year-round. Certainly the majority of the population would have been residing in the area in late July and August as the acorn crop ripened and fell during those months in 1981. The seasonal variation in the maturation of the acorn crop may not have been extreme and the inhabitants would have scheduled their annual collecting procedures for roughly the same time of year.

Winter occupation is inferred on the basis of the sheltered locale, availability of resources, and the large housepit depressions evident at three midden sites. These large pits are similar in size to those at Buchanan Reservoir, sites which Moratto (1972) contended were substantial winter residences. Spring occupation could be tested by faunal analysis on materials derived from archeological investigations.

Chronologically, the placement of the prehistoric resources cannot be properly addressed at this time. Temporally diagnostic artifacts were totally absent, and the limitations of archeological surveys preclude the collection of datable radiometric materials. The well-defined structural depressions at CA-Mrp-610 and -611 suggest that they have a recent protohistoric context, with use possibly terminating with the first influx of gold miners in 1848/49 when there was a massive displacement of the Sierran Native American groups. Documentation for the post-contact period is lacking as there are no definitely associated historic artifacts such as trade beads, glass tools, iron tools, etc.

Research using available documents indicates that the Bear Creek Reservoir area was occupied during the ethnographic period by Miwok. Archeologically, the limited materials obtained by the survey neither support nor deny the contention of Miwok occupation. The use of chiastolite, as seen at Locus 2, CA-Mrp-615, is paralleled at Buchanan Reservoir (Moratto 1972; Peak 1976), which is geographically placed in an analogous environmental position in the lower Sierra foothills. Moratto (1972) placed this reach of the Chowchilla River in Southern Miwok territory.

Although the presence of unmodified cobble pestles has been used as an identifying characteristic for the Miwok (Barrett and Gifford 1933:128; Moratto 1972), this type of pestle has been found at many sites in the San Joaquin Valley in Yokut territory (Peak 1975; Peak and Weber 1978). Sites on the western side of the San Joaquin Valley have been found which display markedly similar characteristics to those in the present study area (James West, personal communication 1981). The sites have large dark midden with a low yield of silicate and volcanic rock flakes, bedrock mortars, and cupules. All have fire-cracked rock as the most frequent artifactual surface material.

As an alternative to either Yokuts or Miwok, occupations by earlier populations may be represented by these sites.

Examination of the Bear Creek settlement pattern shows certain similarities to that defined at Buchanan Reservoir on the Chowchilla River (Moratto 1972:168-170). The two areas are alike in elevation and location within the lower foothills of the Western Sierra Nevada slopes, although geographically Buchanan is 14 miles east of the Bear Creek study zone. Environmentally, the two drainages are comparable, although digger pine is present on the slopes of the Chowchilla River Valley. Most areas, however, can be classified as oak parkland with riparian plant community along the streams, although the upper reaches of Buchanan support a chaparral/digger pine community (Moratto 1972:78).

There were 66 sites located in the 10-square-mile study area, and Moratto defined a settlement system in which he segregated five classes of sites:

1. Isolated bedrock mortars (no midden).
2. Campsites which had 0-9 bedrock mortar pits and 0-2 small housepits (less than eight meters in diameter).
3. Small Village sites which had 10-49 bedrock mortars and 0-6 small housepits.
4. Large Village sites which had 50-99 bedrock mortars and 0-9 small housepits.

5. Village Community Centers with more than 100 bedrock mortars, numerous small housepits, and one or more large housepits (over eight meters across and interpreted as ceremonial structures) (Moratto 1972: 88-90).

All major village centers were located on the Chowchilla River while large villages were found along the river and tributary streams. The small creek supported the small villages and campsites. The earliest settlements appeared to have been on the Chowchilla River, which normally has an intermittent flow and is often dry from July to November (Moratto 1971:74). Based on the fact that the earliest sites were on the river, a long-established pattern of seasonal transhumance to the upper reaches of the mountains was suggested (Moratto 1972:169).

In the late Madera Phase, post A.D. 1500, there was a widespread establishment of camps and villages on small streams away from the river. These small sites lacked ceremonial structures, which were confined to the major village centers. In essence, the settlement pattern for the Madera Phase has been defined by the presence of very large central villages along the river, with the smaller subsidiary villages on tributaries. The Village Community Center is postulated as the Chief's residence and, as such, the major annual ceremonies took place there (Moratto 1972).

At Bear Creek, the Village Community Center is probably represented by CA-Mrp-610, which is areally very large, (14,950 m²). The site is larger than two of the Buchanan Village Centers. The Buchanan Village Center of CA-Mad-117 was areally larger, but contained only 19 housepits as compared to CA-Mrp-610 with 30 structural remnants. CA-Mrp-610 has two housepit depressions which can be classified as large housepits (Moratto 1972:83) and other may prove to be as large when a more definite measurement of their dimensions is undertaken through grass clearance and excavation.

Seven sites--CA-Mrp-402, -599, -604, -610, -612, and Loci 1 and 2 of -615--may be classified as Large Village sites as all have 50 or more bedrock mortar pits. Two sites (CA-Mrp-408 and -600) with less than 50 mortar pits can be placed in Moratto's Small Village site class (1972:83). CA-Mrp-407 may be a Campsite although it is a somewhat enigmatic site since a true midden is lacking.

All of these midden sites, disregarding size or complexity, are located near Bear Creek at a point at which a small tributary joins the larger creek. In part, this may be due to the natural forces of soil deposition which tended to build a terrace near the junction.

CA-Mrp-611 lacks associated bedrock mortars and falls into Moratto's Campsite class. There are seven well-defined housepit depressions and a developed midden of 85cm depth. It is isolated from the other midden sites on the slopes of the hills well away from Bear Creek and a tributary stream. It is quite possible that a spring was once present, although there is none nearby now.

Despite certain similarities in the settlement system between the Buchanan Reservoir area and Bear Creek, the contrasts are even more striking. Moratto (1972) found only four isolated bedrock mortar sites with no associated midden. There are 11 isolated bedrock mortar sites at Bear Creek. Considering the much larger study area at Buchanan, the disparity is quite extreme. In addition, the overall density of sites at Bear Creek far exceeds that at Buchanan. Moratto's (1972:82) study recorded 6.6 sites per square mile, while the density at Bear Creek is 20.77 per square mile (27 prehistoric sites in a 1.3 square mile study area).

The most outstanding difference which is immediately discernible is the extensive rock art at Bear Creek. Moratto found no petroglyphs in the Chowchilla River area, although King (1969:73) reported a cupule boulder at CA-Mad-153 and Peak (1976:111) reported seven loci of cupules at CA-Mad-159 in the Buchanan study area. At Bear Creek, there are five complex midden sites which have associated rock art and five sites which have petroglyphs and no midden, although bedrock mortars may be present.

Cupules are found at CA-Mer-237, CA-Mrp-402, -600, -606, -614, and at -615, Locus 1. These are pecked pits which are small in diameter (usually less than three centimeters) and shallow in depth. The majority are slightly ground, but not extensively. CA-Mer-237, CA-Mrp-600, and -615 have cupules only, while the other three sites have curvilinear and rectilinear motifs also.

Petroglyph elements are pecked and not incised into the smooth hard rock faces. The pecking appears to have been accomplished by striking a sharp, pointed rock with another one. This has produced a design composed of a series of peck marks. Most elements are shallow, although some are up to three millimeters deep.

The pecked petroglyphs and most cupules are related to the large perennial ponds in Bear Creek. Not all ponds have rock art in association, but petroglyph rock art is associated with ponds. Nearly without exception, the designs face the pond and most are very close to the water and are inundated during high winter flows. Extensive mining disturbance may have removed boulders having petroglyph panels on them, thus the presently observed evidence may be skewed. In fact, the survey of nearby Burns Reservoir found that there were instances where bedrock

mortar boulders had been uptilted or pushed into the creek by mining operation.

Some of the pecked petroglyphs also demonstrate that cupules have been subsumed into the pecked designs. It is reasonable, therefore, to suggest that the cupules may be older than the pecked type of rock art and that the later peoples incorporated the cupules into their own design elements.

Rock faces selected for the inscriptions are extremely varied in size and height above the pond. Vertical and horizontal bedrock aspects were chosen as well as the flat or sloping tops of boulders.

At CA-Mrp-402, there are 68 panels on both sides of the stream. Although a few panels contain only a single design element, many panels have numerous elements. Some panels on vertical rock faces measure 1.5 meters from top to bottom. CA-Mrp-606 contains 34 panels which are nearly as complex as those at CA-Mrp-402.

At all sites, with the exception of CA-Mrp-614 where all panels are water-worn, there is considerable variation in the degree of surface weathering of the petroglyphs. They range from sharply defined designs to those that are nearly obliterated by erosion. None is spalled; rather, they are worn smooth from water. In some instances, it is nearly impossible to discern the design either by visual or tactile means.

Design elements range from the pecked cupules to intricate interlocked circles, ovals, and curved lines. Angular patterns, although present, are few in number, which is consistent with Heizer and Clewlow's (1973:27) findings. The design motifs are comparable to those found within the Central Sierra petroglyph style area (see Glossary), wherein Heizer and Clewlow (1973) compiled records on 39 recorded sites with 2,549 elements. It is of interest that the Bear Creek study area contains a total of rock art sites which exceed one quarter of the known sites for this extensive area. None of the elements has any evidence of pigment, although it is quite possible some had been painted as pictographs are known to be present at nearby site CA-Mrp-194. Other sites within the Central Sierra style area also had painted designs (Heizer and Clewlow 1973).

An examination of the motifs which appear at the ten sites indicates that certain elements may be unique, occurring at only one site. Other elements may be present in large numbers at one site and be weakly represented at the other sites. As an example, there are three possible phallic symbols at CA-Mrp-606, and only one is tentatively defined at CA-Mrp-402. No other loci have this element.

CA-Mrp-612 contains many panels dominated by line elements. Circles with wavy lines attached are very frequent at CA-Mrp-606, as are "J" and "U" symbols. At CA-Mrp-402, the circle with interior spokes occurs on several panels. This is not an exhaustive comparison, but is an expression of the most readily observed differences in frequencies of particular elements.

This apparent selection of certain petroglyph designs at different sites may be related to clan, moiety, or family groups who used the symbols to denote their particular territory or water source. Most of the elements do not form recognizable compositions, and this is representative of most Sierra Nevada rock art sites, where the occurrence of such compositions is rare (Payen 1962).

The meaning of these symbols is not readily defined. Payen (1962:74) suggests that most rock art is functional and that the glyphs are a form of magico-religious art used to enhance or strengthen the supernatural or abstract world. Meighan (n.d.: 84) comments that the rock art reflects what was in the minds of the prehistoric artists. The variety in content of designs at rock art sites is remarkable, yet it is also surprising that a specialization or emphasis on a particular kind of rock art is often observed at an individual site or in a region. Other possible elements or combinations are omitted or relegated to a position of seemingly lesser importance. An artist has the capacity to draw anything within the limitations of his skill, yet rock art sites use only a narrow range of the possible elements. This restriction of motifs seems to indicate that rock art is produced under historical, cultural, and possible biological limits or controls (Meighan n.d.:84). Payen (1962:6) draws the same conclusion, as he states that the artist is not free from the influences of his society.

Rock art had group and personal significance or meaning. Interpretations derived from a far different cultural environment are unlikely to be specifically valid, since the artists who created the designs were cognizant of their own cultural imperatives. The symbols which appear as geometric patterns may well have had specific meanings incomprehensible to an outsider. Generalized interpretations may be possible, however, on the overall meaning or reasons for the art (Meighan n.d.:89-90).

The Bear Creek petroglyphs are associated with the spring-fed pools in an otherwise arid drainage. The association of the petroglyph sites with the deep spring-fed pools in an otherwise seasonal drainage suggests that the artists were engaged in some type of water propitiation. Other alternatives may be fertility rites or puberty ceremonies. Whatever the real meaning of these symbols, they are important in that they are the graphic remains of a people's ideational world.

The petroglyphs at CA-Mer-52 at nearby Burns Reservoir are more limited in variety than those at the Bear Creek sites. The predominant motif is spherical or oval in form and some are cross-hatched or have internal parallel lines. The motifs are more deeply incised into the rock surface than are those at Bear Creek, but this is directly related to the softer sandstone, which was easier to peck than the hard schists and slates.

The rock art found at the Bear Creek sites has an overall similarity to that at CA-Mrp-193 and -194. These sites lie nine miles southeast of Bear Creek and are located in the canyon of Deadman Creek at a higher elevation than the Bear Creek sites. Design motifs are primarily curvilinear and there are numerous uses of wavy lines connected to circles. However, there are many designs at both of the Deadman Creek sites which are totally dissimilar to those at Bear Creek.

The petroglyphs at CA-Mer-145 on the Merced River are also very like those at Bear Creek sites. These resemblances are in the curvilinear elements, the mode of pecking, the rock into which they are pecked, the presence of cupules, and the association with bedrock mortar pits (Ostrander 1976).

Payen (1962:94) believed that the style distribution and some element groupings could be correlated with the historic Miwok and Maidu. He suggested that the two groups may have been in their ethnographic territory for a substantial time period and that each group had particular designs. At this time, ascription of the Bear Creek petroglyphs to Yokuts or Miwok is premature. Further survey of this lower foothill region is required to produce data on a wider range of sites for comparative purposes.

The prehistoric sites along Bear Creek in the study area appear to be components of a contemporary settlement system. There is an unfortunate lack of time-sensitive artifacts to adequately address the chronological concerns at this time. However, the well-defined housepits at CA-Mrp-610 and -611 may indicate a recent time period of occupation/use. Many of the depressions are sharply defined, are deep (+50cm), and have easily discernible rims. Erosion has had very little effect on these depressions and, considering the soft loose friable middens, this certainly indicates a rather short time span since abandonment. It is possible that this terminal occupation was as late as 1848, when the rapid influx of miners caused dislocation of native populations from large areas of the lower Sierran foothills. The construction of historic buildings on several of the midden sites suggests that the Indians were no longer occupying these villages during the mining activities.

If the sites were occupied until the late period, they would have been contemporary with the Madera Phase defined at Buchanan Reservoir (Moratto 1972) and with Fredrickson's (1973) Upper Emergent Period. This time period is also reflected on

the west side of the San Joaquin Valley by the Panoche Complex (Olsen and Payen 1969:29).

A comparison of the settlement system on Bear Creek with those observed at Burns and Haystack Reservoir study areas indicates that the systems are different. The Bear Creek sites appear to form a unified set which includes a wide range of site types. At Burns Reservoir there is a lower density of sites and there is none which could be identified as a Village Community Center under Moratto's (1972) criteria, since housepits are totally lacking here. There are several sites which may be Large Village sites, with others tentatively classed as small villages or campsites. Six isolated bedrock mortar loci are also associated with the pattern. Rock art is rare, with only CA-Mer-52, a glyph site, and CA-Mer-591, a cupule site, representing this cultural phenomenon. At Haystack Reservoir study area, there are no housepit sites and bedrock mortars are few in number, with no isolated bedrock mortar stations identified. This is probably due to the type of soft rock found in this area. All four sites have a midden deposit but only two have associated bedrock mortars and there is no rock art. This again is likely to be related to the poor quality of the bedrock.

The contrasts among the settlement systems at the three study areas may be due to the topographic and environmental settings. Most of the Burns Creek area and all of Haystack Reservoir are located at the lower edge of the foothills and onto the grasslands of the alluvial plain. The Bear Creek study area is contained within the lower foothills, and the harder bedrocks suitable for mortar stations are exposed along the channel and on the hill slopes. Oaks are nearly absent at Burns and Haystack, while there are heavy groves of blue oak along the upper reaches of the Bear Creek area.

It is entirely possible that the Burns Creek channel upstream from the proposed reservoir area would produce a settlement pattern more comparable to that of Bear Creek since the environmental setting is also similar there.

Throughout the Bear Creek channel and in the tributary drainages, the ravages of placer mining are extensive. At the reaches below the nearly 90° bend where the creek turns to the west, many of the mining operations are correlated with post-1930 operations (Jeffrey Miller, personal communication 1981). There are dredger spoils and a huge conical pile of cobbles on the hill slope at CA-Mrp-599 (Plate 3). Concrete foundations and parts of a boiler also appear to be of this time period. The ditches and earthen dams in this area are less identifiable as to time period. Above the north bend of the creek, placer mining debris replaces the dredger spoils. There are large, long canals for diversion of the creek water in order to tap the gold-bearing gravels. Large terraces are now broad expanses of cobbles and the cut banks are still visible. Earth dams, earth and slab dams, and ditches are very frequent in occurrence.

Associated with the placer diggings are the remains of chimneys, structures, ovens, walls, quarries, and upright stone slab enclosures. There are five sites which have multiple structural remains (CA-Mrp-399, -400, -401, -612, and -615) and a single dwelling remnant is present at CA-Mrp-610. Although all of the historic dwelling remnants were constructed of slate or schist stone slabs, there is a diversity in the size and mode of manufacture. At CA-Mrp-400, three of the four structures are of dry-laid slabs, although the fireplaces and chimneys have mud mortar. The structures at the other sites have mud-mortared foundations and walls, as do the fireplaces. (See site forms for individual structure descriptions.) The historic features are deteriorating, but still are in a remarkably good state of preservation.

Tentatively, these dwellings are assigned to the early gold rush, when miners overran the gulches of the Sierra Nevada foothills. The Hornitos mining district is situated three miles to the north (Clark 1970:65) and early-day mining camps are noted in Greaser Gulch, Toledo Gulch, and Indian Gulch (Gudde 1975: 142, 353, 168). It is extremely improbable that the avaricious miners would have overlooked the placer deposits on Bear Creek. No documents have been found to identify the camps on this part of Bear Creek or to give the ethnic affiliation of the mines. This is not an uncommon situation in the region, particularly if the placer deposits played out in a short period of time.

Some statements may be made, however, on the archeological remains. Most of the dwellings have interior large fireplaces which were carefully made. This suggests that mining did take place during the winter when warmth was critical. The fact that Bear Creek is seasonal in flow also indicates that the washing of gravels would have had to take place during the winter when water was high enough to divert into ditches.

There is also some indication that there are significant differences in the mode of building, which admittedly may reflect simply a difference in the builder's skills but may also be related to ethnic groups. However, the fact that most structures at CA-Mrp-400 have dry-laid walls, albeit with mud-mortared fireplaces, might indicate that a different ethnic group located here and had a different style of construction.

What is known is that in 1867 a land patent in Bear Creek (Reservoir) lands was obtained by Robert Simpson, Jr. No mention is made of mining claims, so it is reasonable to assume that this activity was no longer of concern. In essence, then, it is reasonable to assume that the buildings were associated with the early period of the gold rush.

IMPACTS

Introduction

Borrow areas. A major impact to resources in the proposed reservoir area will be due to the construction of the dam itself. This includes the construction activities associated with preparing the access roads, the base of the dam, and the spillway. These features of the dam construction are comparatively limited in areal extent (82 acres) and, except for sites which are located where a structure is planned, effects will be minimal. The dam will be of earth-fill construction. The borrow areas from which the construction materials are to be drawn are primarily within the confines of the proposed reservoir, although 30 acres lie downstream (Map 5). The raw material to build the dam will be derived by bulldozing or stripping off desirable raw materials over a comparatively large areal extent. In Bear Reservoir, the gravels are one of the more desirable raw materials and the scraping of the upstream terrain will encompass a moderately large area. The effect on any sites within the borrow areas will be total destruction (see Map 4).

Destruction of the sites within the borrow areas can be avoided if a strip surrounding them is left undisturbed. This buffer should be sufficiently wide that the soil stabilizing procedures planned (contouring, covering with topsoil, and seeding) can be accomplished without impacting the site (see U.S. Army Corps of Engineers 1981:89 for information on soil stabilization). The construction equipment should not cross the sites while conducting the stabilizing procedures.

Inundation. The damage to cultural resources due to fresh water flooding has been of concern for a long time, but it became a major topic in the 1970s. In particular, the National Park Service has undertaken research on this topic under the Reservoir Inundation Studies Project (Carrell et al. 1976; Lenihan et al. 1977), and other projects have been conducted within the same guidelines (Padgett 1978).

The major impacts can be divided into chemical and mechanical impacts. Chemical effects on the soil constituents and the various artifactual categories, facilities, and ecofacts are primarily due to immersion and its consequences. The short-term periodicity of the flood water levels in Bear Reservoir would likely have lessened the chemical impact of inundation.

Mechanical effects are primarily due to the wave action zone, which erodes the soil in the process of cutting benches. Other mechanical impacts of less importance in the project area are "freeze-thaw, liquefaction, desiccation alternating with inundation, and siltation" (Carrell et al. 1976:19). Again, the short periods of inundation would preclude much damage due to

these other factors except, perhaps, for the effects of the alternation of wetting and drying due to inundation. Moreover, the effects of these other factors are less well known than the impacts of wave action since the results are not so observable, particularly in ungated dams of the sort used for flood control.

Impacts

Borrow areas. The proposed borrow areas for the construction materials for Bear Creek Dam primarily encompass a large area upstream from the existing dam, although there are two additional borrow areas totaling 30 acres which lie downstream from the dam. The major borrow areas are within the creek channel and primarily utilize the already mined gravels. The downstream borrow areas do not intrude upon any cultural resources, although the cupule-bearing boulder, CA-Mer-237, lies 7.6 meters north of one of the borrow areas (Map 5).

The borrow areas within the reservoir, however, will impact all of CA-Mrp-399, a large historic complex, and CA-Mrp-403, a bedrock mortar locus. Additionally, the northern section of CA-Mrp-600 is within a proposed borrow area, as is the southern part of CA-Mrp-407, which is a prehistoric site with a bedrock mortar outcrop and an associated cultural deposit. CA-Mrp-408, a midden site, may be affected by borrow activities if these infringe on the site.

The historic complex (CA-Mrp-399) will be totally disturbed by the gravel acquisition, either from direct impact or by the massive changes in the present stream flow. The removal of gravels from the channel will cause the stream to form a new channel and perhaps cause scouring of the location of the individual structural remnants. Another consideration is that the removal of the gravels destroys the visual context in which these structures exist.

The bedrock mortar locus will be completely destroyed by the borrow areas, as will the streamward portions of CA-Mrp-600 and -407. Their preservation can be achieved by leaving an undisturbed corridor around them and then stabilizing the scarp by contouring and planting a ground cover.

CA-Mrp-408 may be severely damaged by equipment traverse, inadvertent intrusion by earth-moving equipment, and, later, by the same erosional effects anticipated for CA-Mrp-600 and -407.

Inundation. The estimation of impacts due to periodic inundation behind ungated flood water dams is a fraught-filled endeavor because there has not been any study undertaken on the impacts to be expected behind such dams. It is known from the records maintained by the Corps of Engineers on the present Bear Creek Dam that some water does back up behind the dam during

some part of most winter seasons. Moreover, in the large flood period in the 1950s, one rancher reported it reached gross pool.

The impacts to be expected will depend on how often and how long the resources will face wave action erosion and inundation. On a rational basis, sites located at the lower elevations will face relatively more impacts, since the rainfall amount needed to raise the water level high enough to impact them will be less than needed to raise it high enough to impact resources at the highest elevations within the pool.

To provide a relative measure of projected impacts, the Corps of Engineers has provided a table of probability estimated for four arbitrary zones, each 30 feet. These are probabilistic estimates based upon the chances of the water rising to any one elevation during any one year. The second column represents the probability that the water will rise to levels within the zone. The third column displays the approximate number of days the water will be within the zone for the corresponding probabilities.

Table 3
Probability and Duration of Inundation*

Zone (elevation in feet)	Probability (percent)	Duration (days)
350-380		
H	70	1
L	2	30
381-410		
H	25	1
L	1	30
411-440		
H	6	1
L	0.1	30
441-470		
H	1	1
L	0.1	15

*The probability and duration are based upon an average for each zone.

Table 3 demonstrates the obvious: that the resources located in the lowest zone have a higher probability of being impacted during any one year than those resources located in higher zones. The advantage of the table is that it provides a rational basis for ranking the degree of impacts expected to affect any one resource.

As stated, the heaviest impacts, both in terms of standing water level and periodic inundation, are expected to occur below 380 feet. This is where mechanical impacts due to wave action would have been the most active and sustained. The next highest level of impact, based upon the probability of the water rising to that zone, would have been in Zone 2, 381 feet to 410 feet. Cultural resources located within this range of elevation still face some probability of impacts from wave action. The lowest level of expected impacts will occur on sites located in the two highest zones above 410 feet. The probabilities are very low and, except for the 25-, 50- or 100-year flood, little impacts can probably be expected.

One of the potential impacts to the cultural resources is siltation. This would be most detrimental to the housepits, although silting of bedrock mortar cups will also occur. Many mortar pits in the lowest zone had been filled in and, in some cases, had been covered by over 10cm of densely compacted fines. It is not unreasonable to predict that this same deposition on a loose, friable midden could cause impacts. In one sense, the sterile top layer might prevent some erosion, although grass has a difficult time establishing itself on the flood silts. This might tend to negate any beneficial effects from the covering by the compacted fine silts as rain runoff would not be slowed by well-established root systems, and gullies might be a result.

A second deleterious impact may occur from the bonding of the soft midden soils with the sterile fines. This would not appear to be an impact of great effect as this situation would involve only the upper few centimeters of the midden.

The angle at which the water level (or wave action zone) meets the ground surface also influences the degree of disturbance of a site through flooding. Less wave erosion will result from a shallow angle than from a steeper angle.

The 30 cultural resources which may be affected by the proposed project may fall into more than one zone, as the 30-foot intervals are arbitrary.

ZONE 1: Elevation 350' to 380'. There are three sites within the elevation range of the lower zone. Three of these are bedrock mortar loci which lack associated midden or other features. CA-Mrp-409 (Plate 1a) has already been discussed under borrow impact and that of the dam construction foundation.

CA-Mrp-598 and -409 will be subjected to the highest probability of inundation, and the inundation period may be 30 days, as it will take longer for the flood impoundment to recede. Siltation may occur and, if sufficient, could bury them.

The only site with a cultural deposit in this zone is CA-Mrp-407 (Plate 2a), which may also receive impact from the adjacent borrow area. This site, at 360' elevation, has already received frequent inundation, but the longevity of standing waters may be increased by the larger gross pool capacity.

ZONE 2: Elevation 381' to 410'. All sites in this zone have also received substantial inundation as they lie within the existing gross pool line of 414 feet.

The 14 sites include five bedrock mortar loci (CA-Mrp-403, -405, -602, -603, and -613), one petroglyph site (CA-Mrp-607), one midden site (CA-Mrp-408), four complex sites (CA-Mrp-402, -597, -599, and -600), and three historic sites (CA-Mrp-399, -400, and -609). This zone will be subject to substantial impacts from wave action and inundation. As the time periods of immersion may be lengthened by the proposed project, the historic structures are the most vulnerable resource since the mud mortar will dissolve, allowing the stone slabs to detach and slump. There may have been some effects already from flooding.

The middens at CA-Mrp-408 (Plate 1b) and at complex sites CA-Mrp-402, -599 (Plate 3), and -600 (Plate 4) may suffer from any increased wave action and siltation as all are on steep-faced terraces. There is some evidence now at midden sites that wave-cut benches have been formed on the streamward face of the cultural deposit. Most of these middens have moderate to sharply angled slopes as though the natural lens shape had been truncated. These faces will be most subject to the effects of flooding and some increased damage may be predicted from the short-term effect of wave action. However, the long-term impacts of periodic inundation due to factors other than wave action are unknown, but some damage is probable.

The five bedrock mortar loci will not sustain increased damage beyond siltation. The petroglyph site, CA-Mrp-607, and the petroglyphs at CA-Mrp-599 and -402 (Plates 7 and 8) may be inundated for longer periods of time than is the current case. Many of the pecked petroglyphs show considerable water wear, while others at the same water level display much less erosion. At present, it is assumed that the wear was being produced as an ongoing natural process during the prehistoric occupation and was caused by abrasion from the winter/spring flood waters. The variation in degree of wear is very probably due to time. If this is so, then inundation by still water should have less damaging effects or at least no more than those of the natural annual flooding by Bear Creek. The metamorphic rock is very hard and there is no extensive evidence of spalling, as was

found at CA-Mrp-52 (Burns Reservoir). At the complex site, CA-Mrp-600, the impacts on the midden have been discussed above. In terms of the historic features, these are comparatively recent and relate to cattle ranching. The springbox and trough are still in use, as is the cattle feeding area on top of the midden.

The three historic sites, CA-Mrp-399 (Plate 5), -400 (Plate 6), and -609, are very vulnerable, and increased periods of inundation may well accelerate the rate of dissolution of the unstable mud mortar. There is no information available to determine the changes in these structures in the 25 years since Bear Reservoir was completed. However, Jeffrey Miller (1981: personal communication) evinced the opinion that there are now fewer standing walls than when he visited these sites as a youth.

ZONE 3: Elevation 411' to 440'. The seven sites which lie all or partially within this zone have not received the inundation impacts sustained by cultural resources in the lower two zones. There are two bedrock mortar sites, a petroglyph site, three complex sites, and one historic site.

The bedrock sites, CA-Mrp-406 (Plate 2b) and -616, show little to no siltation, although in other areas sands and gravels are frequently found packed into the mortar pits closest to the creek. It is doubtful that the project will cause any impacts that differ from those which now occur.

Petroglyph site CA-Mrp-606 (Plate 10) is located at the south edge of Bear Creek channel and many of the designs show extensive water wear. In some instances, the pecked motifs are nearly obliterated and may lie next to elements with no evidence of wear. The same inference is drawn for this site as was made for CA-Mrp-402 (Plates 7 and 8)--that is, natural erosion was taking place while the occupants were still creating new designs on the same rock faces. Increased periods of inundation, therefore, should not cause any accelerated destruction of the petroglyphs as most are already periodically inundated or flooded.

The three complex sites (CA-Mrp-604, -610, and -615) must be discussed in relationship to the various elements contained at each site. Of all the cultural resources within the study area, CA-Mrp-610 appears to represent the major prehistoric village site. The site is areally extensive, 95 meters by 185 meters, and has an estimated midden depth of over 2 meters, 30 well-defined housepits, 19 bedrock mortar loci, and the well-preserved remains of a historic rock and mud-mortar structure. At the present time, the gross pool markers are at the edge of the midden terrace which has the majority of the housepits (26) and the historic structural remnant lies just below this line.

Increased inundation may well cause more extensive wave cutting along this midden edge than is now present. The midden is very soft and friable and will erode readily. The housepits are believed to be exceptionally vulnerable to damage from the standing water and possible siltation, while the bedrock mortars will not sustain much additional impact. The historic feature, similar to those of CA-Mrp-399 and -400, will suffer an increased or accelerated rate of decomposition and wall slump.

CA-Mrp-604 contains a midden deposit, bedrock mortars, three housepits, and petroglyphs. Of these, the bedrock mortars and glyphs will not suffer increased impact. However, the deep midden and housepit at the 430' elevation will be subject to longer periods of flooding and will be more prone to damage. The two pits on the upper terrace (at 450') and the associated shallow (30cm) compacted midden will receive a lesser direct impact.

CA-Mrp-615 is the most complex of the sites in terms of the variation in components. The historic component includes structural remnants, upright stone slab enclosures, dams, ditches, a quarry, and other features (Table 1). The prehistoric component includes two midden sites, Locus 1 and Locus 2, which have associated bedrock mortars, a petroglyph panel, cupules, and four possible housepits at Locus 2.

The historic features are of the same slab and mud mortar construction as at CA-Mrp-399 and -400 and may well suffer increased deterioration if the water level remains higher for longer time periods. Most of these structures are above the 440' level but well below the proposed gross pool elevation of 469.5'.

The midden areas lie on gently sloped flats which have moderately steep faces toward the creek. Some damage to middens is predicted from increased wave cutting, but none is expected for the bedrock mortars and rock art.

The last site to be discussed for this zone is historic site CA-Mrp-401, which has structural remains and is located at 425'. The fireplace and associated oven at the lower elevation are more deteriorated than the fireplace on the upper terrace. Whether this reflects greater impact from standing water or a less skilled original construction for the lower structure is unknown. Again, the mud mortar of these features will erode more rapidly with an increased inundation period or with a greater number of submersions.

ZONE 4: Elevation 441' to 469.5'. This zone will stand the least probability of being inundated and, when inundation occurs, it will be of short duration. Five of the cultural resources within this elevation range are near the northern reaches of the proposed gross pool, while CA-Mrp-608 is on the hill slopes overlooking the lower portion of the reservoir.

There are two bedrock mortar loci (CA-Mrp-601 and -608), one midden site (CA-Mrp-611), two complex sites (CA-Mrp-612 and -614), and an historic wall (CA-Mrp-605) in this last zone. The bedrock mortar loci will not be subjected to adverse effects as they will receive infrequent and short duration flooding and they are in resistant rock.

The midden site, CA-Mrp-611, lies near the upper elevation of the proposed impound and inundation effects will be of low intensity. However, several of the seven housepits are deeply incised into the moderately soft midden and some erosion of the rims and deterioration of the internal structural remains may occur if the reservoir level remains high during extended flood periods.

The complex site, CA-Mrp-612, has both a midden component and historic structural remains. It lies upstream from the sharp northward bend of Bear Creek near the upper limits of the reservoir. The midden has been severely impacted through the construction of the old historic features and, more recently, by a cattle feeder. The better preserved portion of the midden may be wave-cut as the face toward the stream is moderately steep and the stream angles sharply toward it. It is not anticipated that changes in the periodicity or frequency of submersion will adversely affect the associated petroglyphs or bedrock mortars.

The condition of the historic structures ranges from well preserved to quite deteriorated. As they are situated on the terraces above the stream and at elevations between 460' and 465', the predicted impact is of a low intensity.

CA-Mrp-614 is a petroglyph site with two historic rock walls. The glyphs are severely waterworn, clearly demonstrating that natural flood waters have already taken their toll. These glyphs may also be older than those downstream, which could also account, in part, for the advanced state of wear. The walls have withstood flooding already, as is evidenced by brush and debris found above them from previous high water stands.

The old wall, CA-Mrp-605, lies near the upper end of the gross pool and only rarely will it be impacted by water.

EVALUATION OF SIGNIFICANCE FOR NATIONAL REGISTER OF HISTORIC PLACES

The criteria for evaluating potential entries to the National Register of Historic Places depend upon the assessment of their "quality of significance" (National Park Service 1977:6). These potential entries must possess integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, potential entries must satisfy one or more of the following criteria:

1. They are "associated with events that have made a significant contribution to the broad patterns of our history."
2. They are "associated with the lives of significant persons in our past."
3. They "embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that represent a significant and distinguishable entity whose components may lack individual distinction."
4. They "have yielded, or may be likely to yield, information important in prehistory or history."

The assessment of the significance of these sites will be based upon the above criteria. As the majority are prehistoric resources, the latter criterion will be used to judge their significance. The historic resources will have to be judged by the other criteria as well.

The significance of a resource, especially in the context of the informational limits of a cultural resource survey (in contradistinction to archeological excavation and analysis) is based upon the potential of the resource to address the pertinent research questions for a locale as well as those of general anthropological or historical interest. The Research Design presented by Peak and Associates, and the results of the further investigations by the ethnohistorian and historian, will form the basis for evaluating the significance of the resources.

A previous survey (Clewlow 1976) identified 11 sites in the Bear Creek Reservoir, of which 10 were re-recorded by Peak & Associates in 1981. Site CA-Mrp-404, a milling slick, was examined and determined to be a natural feature. Additionally, 20 other cultural resources were identified within the reservoir area (Table 1). A petroglyph site, originally recorded as a bedrock mortar site in Mariposa County (Clewlow 1976) was identified as a cupule site which is in Merced County (CA-Mer-237, formerly CA-Mrp-397) and is near the downstream borrow area (Map 5).

Of the sites in the reservoir, 11 are bedrock mortar loci (CA-Mrp-403, -405, -406, -409, -598, -601, -602, -603, -608, -613, and -616). Most of these are close to Bear Creek, but several lie in locations near springs, small drainages, or are on dry slopes. Extensive mining may have removed associated middens from some of those at Bear Creek, but others appear to have been independent milling sites. Cobble pestles are common associations, but other cultural materials are noticeably absent. Shallow mortar pits do occur, but most pits are over 10cm and many are up to 50cm deep. The numerical frequency of the bedrock mortars and their depth indicate duration and persistency of occupation/use.

Of particular interest are two features found associated with bedrock mortars. Several pits were found to have thin slate covers over the pit while numerous others, when cleaned out, produced large and small broken pieces of the same rock. These are interpreted to be covers used to keep debris from falling into the mortar pits. The second feature, which was observed at four different locations, was the placement of a large flat slate slab near a mortar. The ground is very rocky and uneven and these slabs appear to have served to level the ground and make seating more comfortable.

The bedrock mortar loci have been studied and recorded as adequately as is possible, given practical investigative techniques, and further work on them will likely not yield information "important to the prehistory" of the region; thus, they are not individually recommended for nomination to the National Register. However, they form components of the prehistoric complex of sites to be recommended as an Historic District. Each site's significance rests with its role in the regional settlement system or systems and the period of its use.

Petroglyphs occur at 10 sites and three are classified as petroglyph sites. CA-Mer-237 is a solitary cupule in a boulder overlooking Bear Creek north of the downstream borrow (Map 5). CA-Mrp-607 and -606 contain 10 panels and 34 panels respectively, with the number of design elements for each panel as yet not quantified. Pecked curvilinear and, more rarely, rectilinear motifs are present, and also cupules at CA-Mrp-606.

Until this study, identified rock art sites were comparatively rare in the region and Heizer and Clewlow (1973:26) specifically exclude the Merced County sites CA-Mer-51 and -52 from any particular art style since, at that time, the sample was too small to establish their relationships. With the recording of the 10 additional rock art loci, the potential for in-depth research into the cultural and spatial relationships of the art motifs enhances the significance of these sites. The fact that they are the tangible evidence of a prehistoric people's symbolism is also of significance.

Although a midden deposit is found at 10 sites (one with two loci), the co-occurrence of three or more features places seven of these sites in the Complex category. Of the three midden sites (CA-Mrp-407, -408, and -611), CA-Mrp-407 has a cultural deposit which cannot be called a true midden since it lacks color and textural changes which would indicate an intense organic buildup. A sparse distribution of cultural items occurred to a depth of 90cm, suggesting that activities other than food processing took place here. CA-Mrp-408 has associated bedrock mortars and CA-Mrp-611 has seven sharply defined house-pits. CA-Mrp-408 and -611 are areally extensive although not so large as some of the other sites--e.g., CA-Mrp-610--in this portion of the Bear Creek drainage. They range in depth from 45cm to 90cm and have dark-colored soils. Although these are

not truly ashy soils, the dark color indicates a high organic content. The associated artifacts included flakes, ground stone fragments, manos, metate fragments, and a few flake tools. Lithic materials are volcanic rock, metavolcanic rock, silicates, quartz, and, more rarely, obsidian. Obsidian is an obvious import and some of the other raw materials could also be trade items.

The nine complex sites (CA-Mrp-402, -597, -599, -600, -604, -610, -612, -614, and -615) range in degree of complexity from petroglyph sites with bedrock mortars and historic walls (CA-Mrp-614) to CA-Mrp-615, which has two complex prehistoric loci, historic structures, walls, a quarry, dams, ditches, graffiti, and upright slab enclosures. The seven Complex sites with midden (CA-Mrp-402, -599, -600, -604, -610, -612, and -615) are wide-ranging in degree of preservation. CA-Mrp-402, -599, -600, and -612 have sustained extensive historic impact while CA-Mrp-610 is virtually pristine. The midden depths range from 55cm at CA-Mrp-402 to an estimated two+ meters at CA-Mrp-610 (Table 1). The midden is similar in color, texture, and consistency to that at the midden sites, CA-Mrp-408 and -611, and the types of cultural materials are also comparable. Quantitatively, there is some artifact variation among the sites which may reflect the intensity of use and perhaps the range of activities which took place at each site.

The prehistoric sites along Bear Creek in the study area appear to form components of a unified and possibly contemporary settlement system. The occupation may have been as recent as 1848 when the rapid influx of gold miners dislodged the native peoples from large areas of the Sierra Nevada foothills.

The presence of a major center such as CA-Mrp-610, which has a large (+10 meter diameter) structural remnant surrounded by large and small villages, campsites, petroglyph loci, and special use bedrock mortar sites, is somewhat similar in pattern to the settlement system defined at Buchanan Reservoir (Moratto 1972), although the rock art sites were not a portion of that pattern.

All four of the major research concerns outlined in the Research Design can be addressed at sites with midden through application of scientific data recovery techniques. Although none of the prehistoric sites produced the time-diagnostic artifacts needed to address cultural chronological concerns, it is probable that key indicators would be recovered if excavation was undertaken. In any event, the darkness of the soil and high incidence of fire-cracked rock at the midden sites suggests that charcoal or other burned organic material could be recovered from the sites and submitted for radiocarbon dating. The different kinds of sites identified reflect the settlement system, or systems, and further investigative work on associated artifacts and ecofacts would increase the range and detail of the research questions which can be generated from this concern.

Research questions concerned with social and cultural interactions can be tested at all of the midden sites and probably at CA-Mrp-407 as well. Distributive artifactual studies, special analyses of ecofacts, functional artifact categorizations, and exchange system evidence will all play important roles in addressing this research concern. The surface evidence on the sites indicated that many other research questions concerned with social and cultural interactions are possible.

Demographic research questions commonly involve the study of burials and associated grave goods, and two sites (CA-Mrp-610 and Locus 2 of CA-Mrp-615) produced human bone fragments from three auger test pits. The depth of several other middens suggests that human remains may be present.

In short, the prehistory of this portion of the San Joaquin Valley is so little known that any midden sites with the potential to address multiple research questions must be considered likely to provide "information important in prehistory or history." For example, it is not known with any certainty whether Miwok or Yokuts inhabited the project area in the late prehistoric period (see Appendix 1), and earlier prehistory has not been assessed in the region at all.

Ethnohistoric research failed to produce any locales, features, or sites which are considered important in the traditional Native American belief system. Thus, no nominations within this criterion need be considered. There are no Native American communities left which historically resided within the project area. This includes both Yokuts and Miwok and this, of course, is the major limitation to ethnohistoric research in this region of the Central Valley and the foothills.

There are five historic sites (CA-Mrp-399, -400, -401, -605, and -609) and five complex sites (CA-Mrp-599, -600, -610, -612, and -615) which have extensive historic features. Most of the historic features appear to relate to California's early gold mining period, although some elements such as troughs, wells, wire fences, and cattle feed yards are of a much more recent vintage.

The use of mud mortar and schist or slate slabs in construction was common during the early gold mining era. Building remains which had been constructed in this mode are noted at nearby Hornitos and at Mt. Ophir (Heizer and Fenenga 1948: 97-99) and these are not the only locales where this type of building can be found in the foothill region.

Midwesterners used dry-laid rock walls since they had used stone cleared from fields in that portion of the United States. They brought this style with them to California (Heizer and Fenenga 1948:93).

The structural remains at Bear Creek, although deteriorating, still are in a remarkably good state of preservation. In addition, their isolation on protected private lands has prevented vandalism and the trash dumps are very likely still present in an unmolested state.

The comparatively limited knowledge of the early historic settlement of this region (see Appendix 1), particularly in regard to the early mining operations and settlements in this area, indicates that archeological research offers the potential to enhance knowledge of this period; thus, the historic sites CA-Mrp-399, -400, -401, and -609, and the historic structures at CA-Mrp-610, -612, and -615, can be expected to "yield information important to history" under Criterion 4. Additionally, these building remains may "embody the distinctive characteristics of a type, period, or method of construction," which is a part of Criterion 3.

In essence, there appears to be a complete unified settlement system related to the prehistoric periods of occupation. There is a range of site types which indicates various parts of an interacting whole established by a society. The mining period seems to follow without a hiatus of occupation, although this is undocumented as yet. If so, then the prehistoric sites and the historic ones form a time continuum entering into the early period of the mining years.

It is recommended that the cultural resources, both prehistoric and historic, be considered as an Historical District rather than on a site-to-site basis. Although some of the sites individually have little or no research potential--e.g., the bedrock mortar loci--they are part of the time continuum of area use. As such, each locus or site contributes information on the patterns of land use and resource acquisition. This procurement covers both the biotic and abiotic resources which are or may have present within this portion of the Bear Creek drainage.

MITIGATION/PRESERVATION

The erosive effects on cultural resources of long-term inundation are well established by the studies undertaken by the National Park Service (Lenihan et al. 1978). However, the effects on resources in the periodic flood pools of ungated flood-water dams have not been studied, particularly the long-term effects. The probability estimates for inundation have been prepared by the U.S. Army Corps of Engineers for four arbitrary levels, and they have been used to judge the degree of relative impacts expected for the resources located within them.

Prehistoric Testing Rationale

Where a data recovery program is proposed for the prehistoric resources, a two-phase effort is suggested. The first phase will be a limited testing program to determine what subsurface evidence is present (artifacts, features, faunal and macro-botanical remains, radiometric data material). The purpose of the phase effort is to provide sufficient information to allow the formulation of a realistic data recovery program for a Phase 2 mitigation procedure. The sample size needed to achieve this goal is another problem.

The number of units required to provide an adequate sample to demonstrate the artifact density(s), features, spatial activity areas, and depositional complexity for a limited testing effort has not been the object of much sampling theory. Sampling theory has generally focused upon problems of regional sampling strategies and sample sizes needed to adequately demonstrate the variability of the populations tested. Such studies do not usually provide guidelines to indicate what sample size is required to sufficiently reveal the internal complexity and artifactual variability and density of a site, so a full sampling strategy can be planned (a Phase 2 effort or mitigation).

Ammerman et al. (1978) have recently presented a provocative study which can be used to indicate a probable range of effort for the limited testing of a site. Their report was a computer simulation study which tested the efficacy of different sampling strategies (random and non-random) and different sample sizes. Their known population was an abandoned Masai kraal which had been carefully mapped and all artifacts plotted by provenience. Their results were varied, but two are of importance here.

First, sample units should be small for any given sample size--i.e., it is better to use many small units than a few large ones. Second, an effective sample size ranged from 3 to 15 percent. Above 15 percent, the sample size has to be drastically increased to produce significantly more predictability. Below 3 percent, it is difficult to predict within an acceptable level of tolerance the variability and complexity of the sites. The present discussion is concerned with the data recovery required to fully reflect the variability of the Bear Creek prehistoric resources.

For a limited testing of a site, a fixed 0.1 percent sample of the areal extent of suitable midden is adequate. If a sample size as low as 3 percent can achieve an acceptable level of predictability, then a 0.1 sample should be sufficient to provide a basis for a judgment on the sample size sufficient for data recovery.

Table 4

Recommendations for Nomination

60

Site	Type	Condition	Research potential	No further research	Research recommended	Recommended for National Register
CA-Mer-237	P	Good	None	x		No
CA-Mrp-399	H	Deteriorated	High		x	Yes
CA-Mrp-400	H	Deteriorated	High		x	Yes
CA-Mrp-401	H	Deteriorated	High		x	Yes
CA-Mrp-402	C/P	Good to badly deteriorated	High		x	Yes
CA-Mrp-403	B	Good	None	x		Yes
CA-Mrp-405	B	Good	None	x		Yes
CA-Mrp-406	B	Good	None	x		Yes
CA-Mrp-407	M	Disturbed	Low		x	Yes
CA-Mrp-408	M	Disturbed	High		x	Yes
CA-Mrp-409	B	Good	None	x		Yes
CA-Mrp-597	C/P	Some erosion	High		x	Yes
CA-Mrp-598	B	Good	None	x		Yes
CA-Mrp-599	C	Disturbed	Moderate		x	Yes
CA-Mrp-600	C/P	Very disturbed	Low		x	Yes
CA-Mrp-601	B	Good	None	x		Yes
CA-Mrp-602	B	Good	None	x		Yes
CA-Mrp-603	B	Good	None	x		Yes
CA-Mrp-604	C/hp/P	Good to disturbed	Moderate		x	Yes
CA-Mrp-605	H	Good	None	x		Yes
CA-Mrp-606	P	Some natural erosion	High		x	Yes
CA-Mrp-607	P	Natural erosion	High		x	Yes
CA-Mrp-608	B	Good	None			Yes
CA-Mrp-609	H	Deteriorated	Low	x	x	Yes
CA-Mrp-610	C/hp/P	Very good/historic deteriorated	High		x	Yes
CA-Mrp-611	M/hp	Very good	High		x	Yes
CA-Mrp-612	C/P/H	Moderate to badly disturbed	High to moderate		x	Yes
CA-Mrp-613	B	Good	None	x		Yes
CA-Mrp-614	C/P	Some natural erosion	High		x	Yes

CA-Mrp-615	C/H/P	Deteriorated	High			Yes
Historic	H		High			Yes
Locus 1	M/P	Good	High		x	Yes
Locus 2	M/hp?	Good	High		x	Yes
CA-Mrp-616	B	Good	None	x		Yes

KEY:

Site Type

B = Bedrock mortar
 C = Complex (3 or more elements)
 C/P = Complex with petroglyphs a major element
 H = Historic
 M = Midden
 P = Petroglyph

Elements

hp = housepit
 l = locus/loci
 p = panel

Rondeau (1982) used a 0.6 percent test sample by area at CA-Nev-119, which is comparable in size. The test reveals the approximate age of the site's deposits as well as other important aspects, all confirmed by Rondeau's Phase 2 and Phase 3 efforts. We suggest that sample sizes by area of less than 1 percent can be effectively used if placed properly in a limited testing situation.

In addition to the field effort, detailed analyses of the debitage, faunal material, botanical samples, possible human burials, and typological study of tools are necessary parts of the proposed limited testing program for all sites. The surface evidence indicates that obsidian hydration and sourcing are also suggested lines of evidence. The probability of organic material suggests C-14 dating is possible.

Although the recording of petroglyphs was thorough, with scaled drawings made and a photographic record done, the intense summer sunlight reflected off the shiny flat rock surfaces. It is possible that this glare prevented identification of all the glyphs present. Therefore, a re-examination of the panels at each of the 10 rock art loci should be done. If additional petroglyphs are found, they should be drawn and a photographic record made.

Historic Testing Rationale

In order to address the research concerns, a multi-disciplinary approach will be required. A more intensive archival search may reveal information on the mining camp/camps which are on Bear Creek. Claims records, tax assessment rolls, deeds, and other county records are possible sources of information.

As there are trash deposits at CA-Mrp-615 and there is a strong possibility that these exist at the other historic sites, these should be identified and excavated in order to obtain datable artifacts and, perhaps, identify the remains of the Bear Creek trading post. Analysis of artifacts might then allow a more accurate dating.

By recovering specific data on construction modes and styles which may differ among the historic sites, it may be possible to identify ethnic influences. Analysis of the building remains and cross-comparisons to other buildings which have been correlated to specific ethnic influences may allow the same correlation at Bear Creek. The data recovered can also be analyzed and compared to other structures known to have served as trading posts or ranch buildings.

In order to accomplish the data recovery and analysis, the multidisciplinary approach should include an historian, an historical architect and an historic researcher. The historian and architect would serve as consultants to the principal archeologist to provide the input to properly recover the data necessary to address the questions.

The field program should be oriented to returning information on the construction styles and modes, identifying trash dumps/privies, and excavating these. The interiors of structures should be cross-trenched, an exterior wall trenched, and a detailed line drawing of wall construction should be prepared.

The analysis of artifacts will be done by identifying those with maker marks, or specific manufacturing styles, and then using comparative data to date the artifacts.

The cultural resources are discussed by location or by elevational zone.

Downstream Borrow Area

The petroglyph site, CA-Mer-237, has a single cupule pecked into a small outcrop of bedrock. The location is outside the proposed borrow area (Map 5) and thus it will not be subject to direct impact. The recommendation is to restrict all equipment from the location to avoid inadvertent impact. Flagging the location should suffice to protect the site.

Reservoir Zone 1: Elevation 351' to 380'

As discussed, there are three resources located in this elevation zone. The probability estimates indicate that resources in this zone will frequently face inundation.

CA-Mrp-598, CA-Mrp-409. The two bedrock mortar loci will not undergo additional disturbance from inundation, although CA-Mrp-409 will be covered by the base of the new dam.

No further work is recommended as the sites have been mapped, survey forms completed, mortar holes measured, and a photographic record made.

CA-Mrp-407. This bedrock mortar locus has an associated cultural deposit not described as a midden as it lacks a discrete color and textural change to distinguish it from the surrounding culturally sterile soils. The cultural deposit contains a few cultural items (Appendix 2, Auger Tests), and research potential is considered low. Impact may occur through borrow procedures and continuing inundation will take its toll. In addition, the site is adjacent to a borrow, which is a major concern.

ALTERNATIVE 1. As always, the best alternative would be preservation, but this is not possible since impact is already occurring from the existing reservoir. The potential borrow impact is also of major consideration and avoidance would be nearly impossible.

ALTERNATIVE 2. A data recovery program is, therefore, suggested for this cultural deposit. There are approximately 625 square meters of area suitable for sampling (Table 2) and a 0.1 percent Phase 1 testing is recommended for the cultural deposit. The one 1 x 1 meter unit should be so placed as to permit testing near the bedrock mortars. Based on an average depth of 90cm, a total volume of 0.9 cubic meters should be excavated. In addition, a site contour map should be prepared.

Reservoir Zone 2: Elevation 381' to 410'

This zone, still within the existing gross pool, contains 14 sites. Of these, five are bedrock mortar loci unassociated with cultural deposits.

CA-Mrp-403, CA-Mrp-405, CA-Mrp-602, CA-Mrp-603, CA-Mrp-613. The five bedrock mortar loci have already received inundation, but extensive siltation is not apparent. No further work is necessary as they have been mapped, survey forms completed, mortar pits measured, and a photographic record made.

CA-Mrp-607. This is a petroglyph site which will be impacted by a borrow area. If the borrow is moved, the site will still be inundated. In order to minimize the effects, it is recommended that latex impressions be made of the 10 panels by a consultant experienced in this type of preservation. Drawings have been made, as well as a photographic record. However, more detailed photography might be recommended by the consultant.

CA-Mrp-408. The midden site, with three associated bedrock mortar stations, has a shallow deposit depth (45cm). The site has already received substantial historic disturbance from the dirt road, which has removed the southern edge, from other digging, and from periodic inundation.

ALTERNATIVE 1. As always, the best procedure would be preservation, but the location of this site in a zone of considerable periodic inundation will continue.

ALTERNATIVE 2. The most viable approach for mitigation of impact appears to be data recovery. A total of three 1 x 1 meter units is recommended for the midden area of the site. There are approximately 2,800 square meters of testable midden, (Table 2), as there has been destruction and disturbance to a

considerable extent of the site. Selection of the units should be at the discretion of the Field Director in consultation with the C.O.R.

The total volume to be excavated would be 1.65 cubic meters, based on an average midden depth of 45cm plus 10cm of sterile soil.

Prior to the excavation, a contour map should be made by transit and stadia, and all features should be tied in from a permanent datum.

CA-Mrp-402, CA-Mrp-597, CA-Mrp-599, and CA-Mrp-600.

The four complex sites have all been subject to inundation, which may increase in the future. Three of the sites have an associated midden, while CA-Mrp-597 is primarily a petroglyph locus with bedrock mortar pits and an historic ditch. The middens at CA-Mrp-599, -600, and -402 have been substantially disturbed by historic mining. In fact, CA-Mrp-600 has been so extensively disturbed that extensive sampling can only be considered unwarranted.

ALTERNATIVE 1. Preservation is the preferred alternative, but this again is not possible since the sites are now within the present gross pool and have had periodic inundation over the past 25 years.

CA-Mrp-597 will not require any additional work beyond a field review at a different season. A photographic record and drawings of the panels have been prepared to record the identified glyphs. Impacts will probably be less from standing water than from the abrasion of flood waters.

The other three complex sites require a testing program and, as a first step, a site contour map should be made.

CA-Mrp-402. Most of the midden at this site has been destroyed by the mining activity. There are remnants upstream from the petroglyphs at the pond, but the auger testing shows that only a shallow deposit remains. However, a small area of 462 m² on the east terrace above the pond has a midden deposit of 55cm depth. The dark-colored soil contains flakes, ground stone fragments, and fire-cracked rock, suggesting a variety of activities took place here. One 1 x 1 meter unit is recommended, with placement in the center of the midden area.

CA-Mrp-599. This site shows a long, narrow area which totals 9,000 square meters. However, the western portion is not midden, and only about 2,800 square meters of the 60cm depth midden retain integrity. A total of three square meters (or three 1 x 1 meter units) is recommended for testing with unit

selection carefully done to avoid the disturbed zones. Total volume is 2.1 m³, which includes 10cm below the 60cm of midden. A contour map will be made.

CA-Mrp-600. This site has received heavy impact from cattle ranching and very little midden may be undisturbed. A small area (150 m²) which has a depth of 60cm is suitable for sampling. One 1 x 1 meter unit is recommended. A contour map will be prepared.

There are three Historic sites, CA-Mrp-399, -400, and -609, located in this zone of moderately high inundation impact. In addition to the inundation impacts, CA-Mrp-399 lies in a proposed borrow area and faces total destruction from this activity.

CA-Mrp-399. The mud mortar and stone slab building remains now show some wall slump and an increase in periodicity and duration of inundation will almost certainly accelerate the process of deterioration. However, the impact of the borrow is far more certain to eliminate these features.

ALTERNATIVE 1. Preservation is recommended and removing this borrow area from consideration would protect the structural remains and their associated features from this impact. However, the impact from inundation would still be of major concern.

ALTERNATIVE 2. A data recovery program is recommended to accumulate detailed information on construction modes and to locate trash dumps which may provide specifics on site use and dates of occupation.

CA-Mrp-400 and -609 will in all probability face the deleterious effects of periodic inundation. CA-Mrp-609 has already been seriously damaged by natural and flood erosion and little remains. However, the complex of four building foundations and chimneys on the west side of Bear Creek is moderately well preserved. Given a similar stone slab construction as that at nearly all of the historic sites, the same deterioration can be predicted here.

ALTERNATIVE 1. As stated before, the preferable approach is preservation, but the location of the site below the present gross pool line does not permit this type of action.

ALTERNATIVE 2. The same program of data recovery, research, and analysis which was recommended for CA-Mrp-399 should be initiated for CA-Mrp-400. Trenching to recover information on interior flooring and on one exterior wall of each should return specifics on the construction. Line drawings of

walls preserve details on the stone work, which may show ethnic influences.

At CA-Mrp-609, the advanced decay of the building suggests that a collection of the stove parts for possible identification of the maker and date/dates of manufacture will be sufficient.

Reservoir Zone 3: Elevation 411' to 440'

There are seven sites which will be impacted here. The possibility of impact is far less than in the lower two zones. Of these, the two bedrock mortar loci (CA-Mrp-406 and -616) do not require any mitigation procedures since impacts will be so slight as to be disregarded. In addition, the detailed records and drawings of the salient characteristics are more than adequate to have collected all research potential.

The petroglyph site, CA-Mrp-606, has had detailed drawings made of the design motifs on the 34 panels and a complete photographic record made. The only additional work suggested is to re-examine the site at a different season of the year as other elements may be found and recorded.

There are three complex sites, CA-Mrp-604, -610, and -615, which have associated prehistoric middens. In fact, CA-Mrp-615 has two loci which are located on opposite sides of the creek. CA-Mrp-610 has one associated historic structure, while the historic component at CA-Mrp-615 is very extensive, with a wide range of features.

ALTERNATIVE 1. Preservation is, of course, the more desirable course of action, and this entails no project. Some inundation has already occurred in the zone, but this will increase if the project is built.

ALTERNATIVE 2. The probability of inundation within this zone is commensurately less than in the lower zones. Therefore, a limited data recovery procedure is advisable since the long-range effects of short-term episodic inundation are unknown. All three sites should have detailed contour maps on 50cm intervals prepared by transit and stadia as a first stage before any excavation commences.

CA-Mrp-604 lies very close to CA-Mrp-610 and may have been a portion of it. However, there are discrete differences in soil depth and type of housepits, plus the separation by disturbed areas, and the decision was made to give different numbers to the two areas. Much of the lower terrace area of CA-Mrp-604 has been heavily impacted by mining, and excavation results might be subjected to erroneous interpretation. Only a small area of 2,000 square meters is considered testable and this includes a well-defined housepit. On the upper terrace,

the midden is shallower (35cm as opposed to 110cm on the lower terrace), but it has 1,311 square meters and two shallow housepits (Table 2). In essence, a 0.1 percent sample should be an adequate data recovery plan and a conversion to square meters would entail two 1 x 1 units on the lower level and two units of the same size on the upper terrace.

CA-Mrp-610, the major prehistoric site in the study area, has about 7,500 square meters of testable area (Table 2). This areal extent incorporates 30 housepits on two terraces and has an estimated depth of at least two meters of midden depth. A 0.1 percent sample is recommended for the site and this equals eight square meters of sampling units. Naturally, some of the area of investigation should include the housepit depressions as they may contain data relating to the final occupation periods of the Native American population.

Eight 1 x 1 meter units would be required, but, if the depth exceeds 1.5 meters, units would have to be enlarged to 1 x 2 meter dimensions and then shored below this depth.

The historic structure will require trenching and wall illustrations similar to the procedures for other historic sites as well as research.

CA-Mrp-615 is the most varied site complex, although the prehistoric loci are not so extensive or deep as at CA-Mrp-610. Locus 1 has 2,940 square meters of testable midden area, while Locus 2 has about 3,080 square meters of midden area which can be sampled (Table 2).

The prehistoric component is very rich in associated types of elements. Of all the prehistoric sites, this one appears to offer the highest information yield, as the degree of impact is quantitatively less than in the lower zones. A test sample of 0.1 percent is recommended for Locus 1 and Locus 2. At Locus 1, this figure converts to three square meters, with three square meters for Locus 2 also. Total volume equals 7.95 m³, including 10cm below midden into sterile. A map will be required. The historic component requires the same approach as recommended for the other historic sites and features. Interior cross-trenching, exterior wall trenching, a detailed wall illustration, a search for trash dumps/privies, archival research, and comparative analysis are needed.

The last site within Zone 3 is historic CA-Mrp-401, which has three structural remnants near a heavily mined area with placer tailings, retaining walls, ditches, and diversion dams. Impact from inundation will accelerate the deterioration and a data recovery procedure similar to that recommended at CA-Mrp-615 is warranted.

Reservoir Zone 4: Elevation 441' to 469.5'

The uppermost inundation zone will receive the lowest amount of inundation impacts. There are six cultural resources contained in this zone, including two bedrock mortar loci (CA-Mrp-601 and -608), a midden site with housepits (CA-Mrp-611), two complex sites (CA-Mrp-612 and -614), and a historic wall (CA-Mrp-605).

The two bedrock loci lack any associated midden areas and do not require additional work. The complete recording includes map, mortar pit measurements, and photographs and there is little research potential beyond these data.

The midden site, CA-Mrp-611, lies near the upper elevational reach of the proposed gross pool. Its location indicated that impact will be of infrequent occurrence and of short duration. However, some impact will occur and a limited data recovery program is recommended. Of the midden area of 2,116 square meters, a test sample of two square meters should be sufficient. This sample should include units and limited house-pit exploration as little is known of the construction modes in this region.

Of the two complex sites, CA-Mrp-615 is primarily a petroglyph site near a pond. The associated features are two historic walls and a bedrock mortar locus. The research potential of the associated features is extremely low since all pertinent data have been recorded. The petroglyphs have also been intensively recorded, drawn, and photographed. A re-examination at a different season of the year is suggested, with recording of any additional glyphs if these are present.

CA-Mrp-612 has both historic and prehistoric components, although the majority of the midden has been destroyed. A total of 1,750 m² remains within the three lobes. Considering the low impact prediction and the high degree of previous disturbance, a sample of three square meters will adequately suffice as a Phase 1 test. One 1 x 1 meter unit should be placed in each lobe.

For the historic features which will be more vulnerable to inundation impact than the prehistoric constituents, a data recovery plan similar in all aspects to that proposed for the other historic sites in the study area is recommended.

The historic wall, CA-Mrp-605, is at the gross pool edge and the already completed recordation constitutes the maximum effort required to mitigate any effects from the proposed project.

Table 5

Testing Recommendations

70

Elevation	Sites by elevation	Type	Location	Impact	Recommendation	
					Alt. 1	Alt. 2
345'	CA-Mer-237	P	Downstream borrow	None	No further work	
360'	CA-Mrp-598	B	Reservoir	Inundation	No further work	
360'	CA-Mrp-407	M	Reservoir	Borrow/Inund.	Preservation	Test 1 m ²
370'	CA-Mrp-409	B	Reservoir	Covered by dam	No further work	
380'	CA-Mrp-613	B	Reservoir	Inundation	No further work	
380/425'	CA-Mrp-405	B	Reservoir	Inundation	No further work	
390'	CA-Mrp-602	B	Reservoir	Inundation	No further work	
390'	CA-Mrp-403	B	Reservoir	Inundation	No further work	
390/400'	CA-Mrp-399	H	Borrow	Borrow	Preservation	
400/415'	CA-Mrp-408	M	Reservoir	Borrow/Inund.	Preservation	Data recovery
400/469'	CA-Mrp-599	C	Reservoir	Inundation	Preservation	Test 3 m ²
400/420'	CA-Mrp-600	C/P	Reservoir/Borrow	Borrow/Inund.	Preservation	Test 3 m ²
410'	CA-Mrp-603	B	Reservoir	Inundation	No further work	Test 1 m ²
410'	CA-Mrp-607	P	Reservoir/Borrow	Borrow/Inund.	Preservation	Latex impressions
410'	CA-Mrp-597	C/P	Reservoir	Inundation		Review for additional glyphs
410/425'	CA-Mrp-402	C/P	Reservoir	Inundation	Preservation	Test 1 m ² ; review for additional glyphs
410'	CA-Mrp-609	H	Reservoir	Inundation	Preservation	Limited collection
410'	CA-Mrp-400	H	Reservoir	Inundation	Preservation	Data recovery
420'	CA-Mrp-406	B	Reservoir	Inundation	No further work	
420'	CA-Mrp-606	P	Reservoir	Inundation		Review for additional glyphs
420/430'	CA-Mrp-610	C/hp	Reservoir	Inundation	Preservation	Test 8 m ²
430'	CA-Mrp-401	H	Reservoir	Inundation	Preservation	Data recovery
430/450'	CA-Mrp-604	C/hp/P	Reservoir	Inundation	Preservation	Test 4 m ² ; review for additional glyphs
430/455'	CA-Mrp-615	C	Reservoir	Inundation	Preservation	Data recovery

430/450'	Locus 1	C/P	Reservoir	Inundation	Preservation	Test 3 m ²
430/450'	Locus 2	C/hp?	Reservoir	Inundation	Preservation	Test 3 m ²
435'	CA-Mrp-616	B	Reservoir	Inundation	No further work	
455'	CA-Mrp-608	B	Reservoir	Inundation	No further work	
455/465'	CA-Mrp-612	C/P/H	Reservoir	Inundation	Preservation	Test 3 m ² ; review for additional glyphs
460'	CA-Mrp-601	B	Reservoir	Inundation	No further work	Review for additional glyphs
460'	CA-Mrp-614	C/P	Reservoir	Inundation	No further work	
460'	CA-Mrp-605	H	Reservoir	Inundation	No further work	
460/465'	CA-Mrp-611	M/hp	Reservoir	Inundation	Preservation	Test 2 m ²

KEY:

Site Types

B = Bedrock mortar
C = Complex (3 or more elements)
C/P = Complex with petroglyphs a major component
H = Historic
M = Midden
P = Petroglyph

Elements

h = housepit
l = locus/loci
p = panel

CA-Mrp-400	H	X			X	Data recovery
CA-Mrp-401	H	X			X	Data recovery
CA-Mrp-605	H	X	X			

KEY:

Site Types

B = Bedrock Mortar
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hp = housepit
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SCHEDULE FOR LIMITED TESTING

Prehistoric Sites

It is proposed that a Phase 1 test procedure be initiated at the 10 prehistoric sites which have a midden component. The testing rationale proposes a 0.1 percent sample of the areal extent of the midden suitable for testing (Table 2). Volume is calculated from the known or estimated midden depth at each site (Table 1).

The person-hours required to excavate the soil are calculated on the expected production rate, with allowances for set-up time, profiling of unit side walls, and backfilling. Each site would require the preparation of a contour map by using a transit and metric stadia. The hours required for mapping are given in Table 7 and these vary according to the complexity of the site.

The rock art review and recordation of any additional petroglyphs would take seven person-days. The crew would be composed of eight archeological technicians under the direction of the field director and one crew chief. The proposed work would require the crew to be in the field for 16 crew work days or 3.2 weeks.

The draft report would be due three months after completion of all field work. This time period is required to complete laboratory work, analysis, graphics, and write-up.

Special analysis may be required to produce the information for an evaluation of significance.

Lithic analysis. A three-task effort is proposed for analysis of the lithic flaked component. Task A will be the overall analysis to distinguish the tools and debitage categories, the steps in the reduction process present, and measurements and observations designed to reveal them. Task B will be the micro-wear study of samples of tools and debitage. Task C will be the preparation of the report.

Task A. The examination of the lithic flaked component will consist of identifying those artifact categories and attributes which best describe the lithic reduction process which formed the assemblage. The basic artifact categories are tools and debitage. Tools are classified as any lithic blank which has been so modified as to change its shape to some significant degree. The debitage categories recognized are those which reflect aspects of the lithic reduction process. A commonly used lists consists of interior flakes, cortical flakes, core platform flakes, bifacial thinning flakes, hinge flakes, burin spalls, scraper retouch flakes, chips, chunks, and cores. Other

categories can be used if deemed necessary, as well as the deletion of some of the above.

Attributes commonly recorded are dimensional measures, platform angles, number of dorsal scars, sometimes the dorsal scar patterns, types of retouch or preparation, edge angles, and other attributes which reflect the techniques and methods used. The attributal study will be undertaken on a randomly drawn sample of the population of each relevant artifact category.

Task B. The microwear examination will consist of a systematic study, with a binocular microscope, of selected artifact categories for evidence of usage. The kinds of evidence usually recognized are abrasion, polish, crushing, and striations. Their location on the working edge of an implement often reveals the kinematic movement of the tool during its functional use. An estimate of 30 minutes per artifact was used to project the time necessary for this task. This estimate agrees with that utilized by others as well as with personal experience. A 1 percent sample of the debitage will be drawn and also studied for traces of wear and use.

Task C. In addition to preparing a report on the above tasks, the interpretive results will be integrated with information from other aspects of the research program.

Obsidian hydration and source characterization analysis. Obsidian hydration dating can provide a diversity of information regarding archeological cultures. The two primary applications of the method are relative and chronometric dating. Relative dating can involve the testing of site stratigraphy, seriation of artifact forms with a stratigraphically mixed deposit, artifact reuse, and exchange. It can also provide a relative temporal ordering of sites within a given region so long as the obsidian source(s) hydrate at the same rate and environmental conditions remain relatively constant.

Chronometric applications normally involve the calculation of absolute ages in calendar years from obsidian hydration readings. This is normally based upon an empirically derived obsidian hydration rate curve, usually defined for a single obsidian source in a given environment on the basis of a series of obsidian hydration-radiocarbon associations. These associations should span the entire time range for human utilization of obsidian resources in the study area.

In addition, when combined with obsidian source characterization analysis, obsidian hydration dating can provide valuable diachronic information regarding prehistoric exchange systems within the study area.

Faunal analysis. The analysis of the faunal material from a site can provide evidence concerning subsistence practices, butchering techniques, food preference, seasonality of exploitation, carrying capacity, and group size or duration of occupation. Faunal studies thus provide one of the more productive lines of evidence which can be pursued to reconstruct past lifeways.

C-14 dating. The establishment of a chronology is a requisite part of any archeological investigation. C-14 dating is one of the more productive radiometric dating methods and, since any organic material can be dated, it is one of the more valuable tools in archeological studies.

Native American involvement. In addition to the Special Studies (some may be optional), there is a need to have cooperation with the Native American people to insure protection of their heritage values. Although no members of the Indian communities which once resided in this region were identified, the prehistoric resources should be considered as important to other Native Americans. A consultant should be retained during the field excavations to provide liaison with local Native American groups and with the Heritage Commission.

Table 7

Phase 1 Prehistoric Testing Procedure
Estimated Field Hours

Midden tests	Excavation		Mapping hours
	m ³	hours	
CA-Mrp-402	0.65	18	48
CA-Mrp-407	0.90	24	8
CA-Mrp-408	1.65	44	16
CA-Mrp-599	2.10	56	16
CA-Mrp-600	0.70	19	16
CA-Mrp-604	3.40	92	32
CA-Mrp-610	12.0	320	24
CA-Mrp-611	1.0	28	16
CA-Mrp-612	2.2	60	32
CA-Mrp-615	7.95	212	48
	31.85	873	256
Total Hours (excavation and mapping)			1,129
Travel (including movement to and between sites)			95
Rock Art Review			56
TOTAL HOURS			1,280

Historic Sites

In order to address research concerns on the historic structures which occur at six loci in the study area, intense archival research and testing are required. It is proposed that the field work be oriented toward recovery of data on structural interior and exterior construction modes, method of wall construction, and location and excavation of trash dumps/privies. In order to accomplish this, two structural remains should be tested at CA-Mrp-399, -400, and -615, and one at CA-Mrp-401, -610, and -612. This variation in number of structures tested is derived from examination of the structures and review of illustrations and notes. CA-Mrp-399, -400, and -615 are more complex and display more variation in size and type of buildings at these loci.

The interiors of the tested buildings would be cross-trenched, one exterior wall, and a detailed line drawing of wall construction prepared. Probing and perhaps the use of a metal detector would be employed to locate trash dumps and privies. Two of these features would be excavated at each site.

The crew would be composed of eight archeological technicians under the direction of a field director and a crew chief. The proposed work would require the crew to be in the field for nine crew work days or two weeks.

The historic researcher would require 15 days to conduct the examination of archives and documents. Consultants required would be a historian and a historical architect.

Table 8
Phase 1 Historic Testing Procedure
Estimated Field Hours

Historic tests	Number of buildings	Excavation/mapping hours
CA-Mrp-399	2	96
CA-Mrp-400	2	96
CA-Mrp-401	1	64
CA-Mrp-610	1	64
CA-Mrp-612	1	64
CA-Mrp-615	2	96
Total Hours		480
Travel (including movement to and between sites)		64
TOTAL HOURS		544

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PERSONAL COMMUNICATIONS

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GLOSSARY

ADAPTATION: Cultural developments by which a society relates successfully to its effective environment.

ALLUVIUM: Unsorted sediments (mixed silt, sand, gravel, cobbles, etc.) deposited by a stream.

ARTIFACT: Any product of human cultural activity (such as tools, weapons, works of art, etc.).

ARCHEOLOGY: The branch of anthropology devoted to the scientific study of past cultures through their material remains. Archeology seeks to describe and explain the nature and evolution of cultural systems.

BASALT: A dense, fine-grained, tough extrusive igneous rock; a common material in California lava flows. Indians chipped basalt into knives, points, scrapers, and other artifacts.

BEDROCK MILLING STATION: An outcrop of bedrock with one or more mortar cups, milling slicks ("bedrock metates"), gyratory mills, or other features related to food grinding or crushing.

BIFACE: Any stone artifact chipped on both sides or faces; most projectile points, knives, drills, etc., are bifaces.

BIFACE THINNING FLAKE: The convex-shaped flakes removed off a biface during manufacture or maintenance.

B.P.: Before Present; by convention, before A.D. 1950; often used in citing radiocarbon dates.

BLADE: A flake twice as long as it is wide, usually struck from a specially prepared core.

CARBON-14 (RADIOCARBON) DATING: A method for determining the age of organic material by measuring the extent to which the isotope carbon-14 (^{14}C) has decayed into stable nitrogen-14 (^{14}N), comparing the ^{14}C fraction with its known half-life of $5,568 \pm 30$ years.

CENTRAL SIERRA PETROGLYPH STYLE AREA: The central portion of the Sierra Nevada mountain range and adjacent foothills which includes all or part of Amador, Butte, Calaveras, El Dorado, Madera, Mariposa, Merced, Nevada, Placer, Plumas, Sacramento, Sierra, and Stanislaus Counties.

CHERT: A flint-like rock composed of chalcedony with variable amounts of clay and other impurities

CHOPPER: A large, usually crude, pebble, cobble, or core tool--typically percussion-flaked to form an axe-like cutting edge along part of the margin--used for various heavy chopping and cleaving work.

CIRCLE AND DOT: Petroglyph with elements of one, two, or several concentric circles with a dot or sphere inside.

COBBLE PESTLE: A minimally shaped, naturally elongate, cobble intended for use in a bedrock mortar.

COMPLEX: A patterned grouping of similar artifact assemblages from two or more sites, presumed to represent an archeological culture.

COMPONENT: A site or a stratum within a site which represents the activities of one cultural group during a relatively brief interval of time. Similar components within a locality or region comprise a phase.

CORES: The lithic cobble, nodule, or prepared artifact from which flakes or blades are struck.

CULTURE: The non-biological and socially transmitted system of concepts, institutions, behavior, and materials by which a system adapts to its natural and human environments.

CULTURE HISTORY: The archeological sequence of cultural activity through time, either within a defined geographic space or with reference to a particular group of people.

CUPULE: A small, round pecked petroglyph.

CURVILINEAR: Free-form or geometric motifs consisting of wavy or non-linear elements joined by curves.

DEBITAGE: Lithic refuse or debris produced by flaked stone tool manufacture. An analysis of debitage can yield much information about technology, skills, and economic variables.

DEMOGRAPHY: The study of human populations with special reference to their size, density, composition, and distribution.

ECOFACTS: The faunal and botanical material carried into a site by the agency of man.

ETHNOGRAPHY: The direct anthropological study of living human groups or the indirect study of groups through interviews and archival research.

FACILITY: A large, complex artifact or part of a cultural site (e.g., a hearth, cairn, house remains, rock alignment).

EXCHANGE SYSTEMS: The trading networks through which goods are moved from one consumer group to another.

FIRE-CRACKED ROCK: Clastic rock fragments broken by heat from fires in the past.

FLAKES: The lithic artifact struck from a core.

FLAKE-SCRAPER: A small flake of stone used as a scraping tool; flakes may be retouched or used without such modification.

GRINDING SLICK: A smooth flat surface on a boulder or bedrock which has been used in conjunction with a mano to crush seeds and nuts.

HAMMERSTONE: A hard, tough, fist-sized rock used as a hammer to work stone, drive wedges, splinter bones, etc.

HEARTH: A feature consisting of ash, charcoal, burned rock, charred faunal remains, oxidized earth, and/or other evidence of fire kindled by humans.

HOUSEPIT: A depression of any shape representing the former location of a partly subsurface structure.

IN SITU: In place; a term applied to archeological phenomena which are found in their original, undisturbed position or location.

LANGUAGE FAMILY: A group of two or more languages that developed from a single ancestral language; the latter is referred to as the proto-language for that family.

LITHIC SCATTER: An archeological site consisting of chipped and, less often, ground stone artifacts and refuse distributed on or near the surface.

MANO: From the Spanish la mano ("hand")--a loaf-shaped hand-stone used for grinding seeds, pigments, etc., on a metate or millingstone.

METATE: From the Aztec metatl, a stone slab upon which corn and other grains are milled with the aid of a mano, which is used in a push-pull motion.

MIDDEN: A deposit, marking a former habitation, which contains such materials as discarded artifacts, bone and shell food refuse, charcoal, ash, rock, human remains, and structural remnants.

MITIGATION: Minimization; in colloquial jargon, the reduction of adverse effects to cultural resources by avoidance, data collection, or other means to preserve potential data.

MORTAR: A strong bowl-like vessel or receptacle in which substances are crushed or pounded with a pestle.

BEDROCK MORTAR: A mortar "cup" or pit in a bedrock outcrop.

BOWL MORTAR: A shaped stone bowl in which foods were processed.

COBBLE MORTAR: An unmodified cobble in which a mortar pit has been ground.

OBSIDIAN: Natural volcanic glass. This was the most prized material for chipped stone artifacts in California,

OBSIDIAN HYDRATION DATING: A method for determining the age of obsidian artifacts by measuring the thickness of a specimen's hydration "rim" (layer of water penetration) and comparing the rim depth with a rate for the particular climate/geographic area and type of obsidian being studied.

PALYNOLOGY: The study of fossil pollen for the purpose of reconstructing former vegetation assemblages and climatic conditions.

PESTLE: An elongate, often cylindrical, stone or wooden artifact used to pulverize food products and other stuff in a mortar.

PETROGLYPH: A design or motif pecked, scratched, or incised into the surface of a rock; unpainted "rock art."

PICTOGRAPH: A design or motif painted onto a rock surface; painted "rock art."

PHASE: A distinctive archeological unit representing a fairly brief interval of time within a locality or region. A phase may be a single component at one site or a prolonged occupation of numerous related sites (Willey and Phillips 1958).

PREHISTORY: The archeological record of non-literate cultures; the cultural past before the advent of written records.

PRESSURE FLAKING: The manufacture of stone artifacts through removing flakes by pressure applied with a bone, antler, or metal knapping tool.

PROBLEM DOMAIN OR CONCERN: A group of related questions or topics to be investigated, along with a discussion of possible ways to study them.

PROJECTILE POINT: A sharp stone or bone tip or point affixed to the distal end of a spear, lance, dart, or arrow.

RECTILINEAR: Angular elements of geometric or sub-geometric designs which consist of linear segments joined at angles.

RESEARCH DESIGN: An explicit, formal articulation of research objectives with a systematic plan for the recovery and analysis of data to achieve those objectives.

RESEARCH QUESTION: Particular hypothesis formulated to assess particular problems.

RESEARCH STRATEGY: The system of concepts by which a theoretical stance is related to a particular research design.

ROCK ART: Designs or motifs of art which are produced on natural rock surfaces. Includes petroglyphs and pictographs.

SAMPLE: Part of a whole; a collection of data taken from and representing a "statistical universe" (a larger body of potential data).

SAMPLING PLAN: The explicit procedures by which data are to be collected.

SCARP: A line of cliffs produced by erosion or faulting, such as the precipitously steep eastern wall of the Sierra Nevada.

SCRAPER: Any of the myriad tool forms used chiefly for such scraping functions as stripping bark, planing wood, removing scarf skin from hides, etc.

STERILE: Devoid of archeological material.

STRATIGRAPHY: The study of cultural and natural strata or layers in archeological and geological deposits.

TRADITION: A way of life or a consistent patterning of technology, subsistence practices, and ecological adaptation which persists through a relatively long interval of time.

TRAIT: Any definable element or aspect of culture suitable for comparative purposes.

TRANSHUMANCE: Patterned movement of people, such as the seasonal population shifts up- and down-slope in the Sierra Nevada.

VERNAL POOL: A pool habitat which may be loosely defined as a small depression, usually underlain by some subsurface layer which prohibits drainage into a lower soil profile, and thus forms a seasonal pool during the winter months.

LIST OF PLATES

Bear Reservoir

Plate 1

- a. CA-Mrp-409 View south of bedrock mortar
- b. CA-Mrp-408 Site view to south

Plate 2

- a. CA-Mrp-407 Bedrock Mortar A
- b. CA-Mrp-406 Bedrock mortar site

Plate 3

- CA-Mrp-599 Historic boiler, mine tailing dump

Plate 4

- a. CA-Mrp-600 View across site toward east and spring area
- b. CA-Mrp-600 Cupules boulder No. 1

Plate 5

- a. CA-Mrp-399 Structure 4, northeast end of fireplace taken toward south
- b. CA-Mrp-399 Structure 3, west side of fireplace, view looking east-southeast

Plate 6

- a. CA-Mrp-400 View west of Structures 2 and 3
- b. CA-Mrp-400 View east of Structures 3 and 6a

Plate 7

- a. CA-Mrp-402 View northeast of pool; petroglyphs and bedrock mortars are on both sides of pool
- b. CA-Mrp-402 Petroglyph Panel 38

Plate 8

- a. CA-Mrp-402 Petroglyph Panel 38 (scale is 1/6 actual size)
- b. CA-Mrp-402 Petroglyph Panel 28, toward west

Plate 9

- a. CA-Mrp-401 Structure 1 fireplace; view looking west
- b. CA-Mrp-401 Structure 3 fireplace; view looking north

Plate 10

- a. CA-Mrp-606 View toward east of Petroglyph Panels 21, 22, 23
- b. CA-Mrp-606 View of Panel 2

Plate 11

- a. CA-Mrp-610 Overview of housepit site; taken toward east, Bear Creek on right side of site
- b. CA-Mrp-610 Historic structural remnant south of midden terrace area

Plate 12

- a. CA-Mrp-604 View northeast across site. Housepit No. 2 is flagged on right front; CA-Mrp-611 is in photo mid-center behind first bedrock exposure.
- b. CA-Mrp-604 View southeast of bedrock mortar, Locus 5; pond in mid-photo Site CA-Mrp-615, Locus 2, in photo upper right.

Plate 13

- a. CA-Mrp-611 View east across site; Site CA-Mrp-615, Locus 2, in photo mid-center
- b. CA-Mrp-611 View northwest of Housepits 5, 4, and 3

Plate 14

- a. CA-Mrp-615 Prehistoric Locus 1 in foreground; view taken east downstream
- b. CA-Mrp-615 Prehistoric Locus 2 in photo mid-center on south side of Bear Creek; bedrock mortar station of Locus 1 in foreground

Plate 15

- a. CA-Mrp-612 View south; midden area in lower left photo
- b. CA-Mrp-612 Structure 1 fireplace; view taken east

Plate 16

- a. CA-Mrp-612 Structure 4; view taken northeast upstream
- b. CA-Mrp-612 Structure 4; close-up of slab and mud mortar walls

Plate 17

- a. CA-Mrp-614 View north of pond petroglyphs on east of pond in photo mid-center
- b. CA-Mrp-614 Close-up of Petroglyph Panel 4



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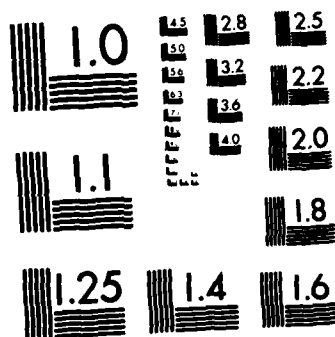
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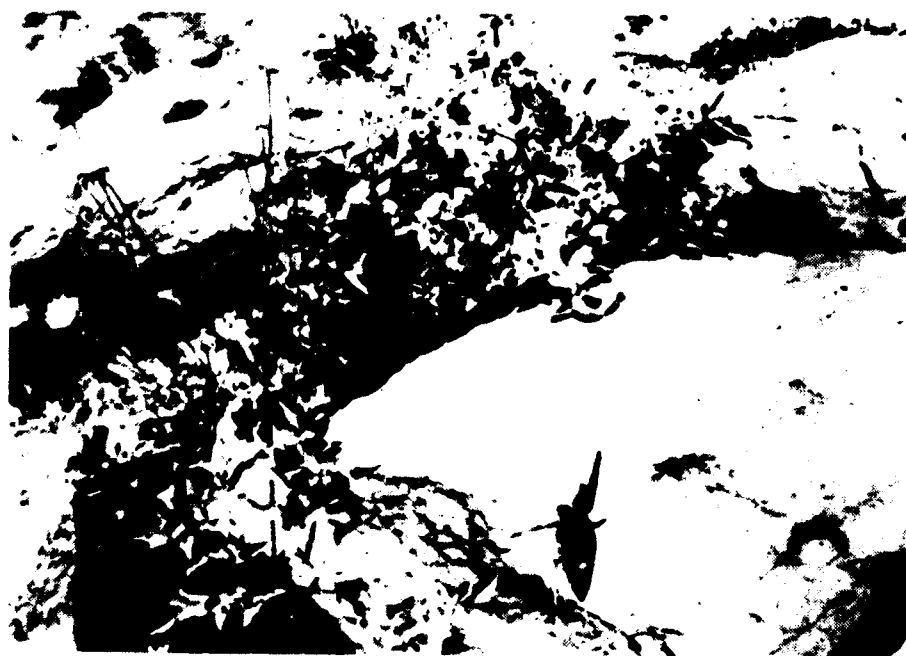
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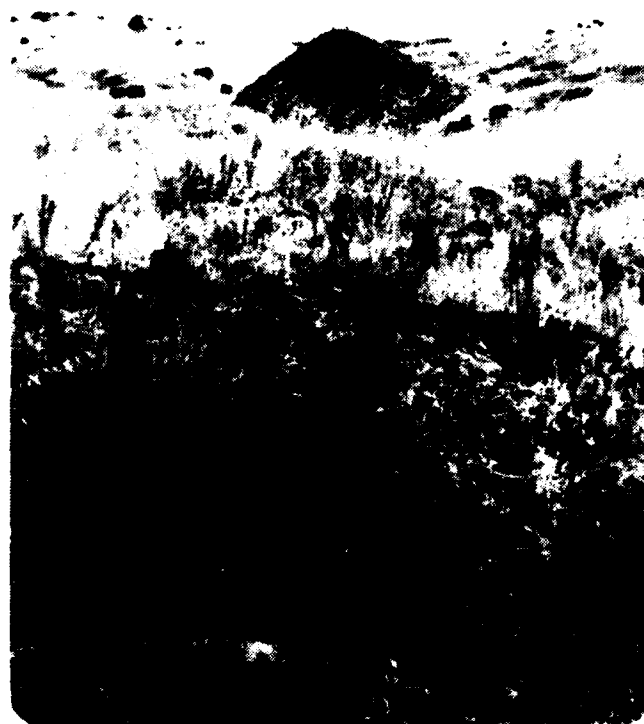
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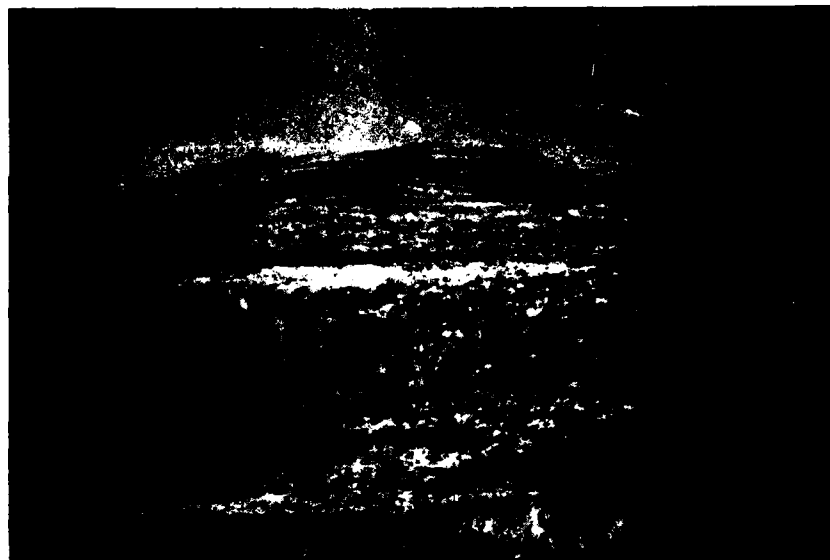
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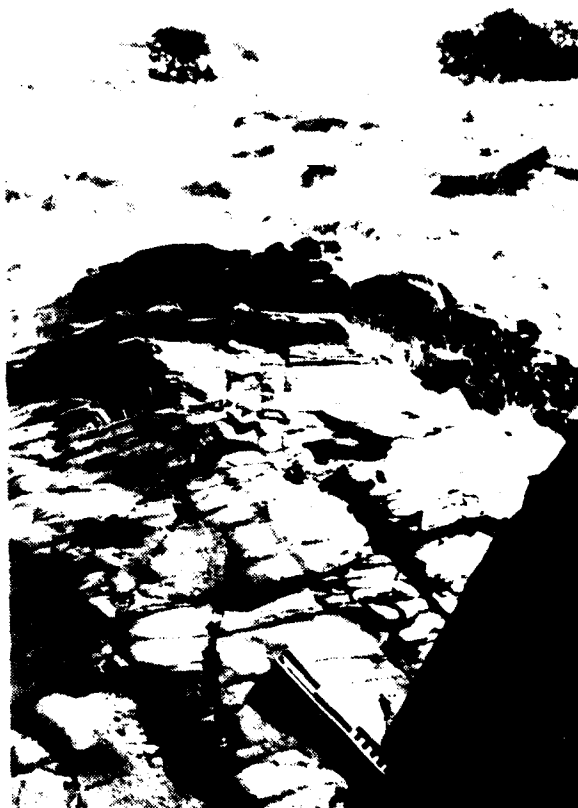
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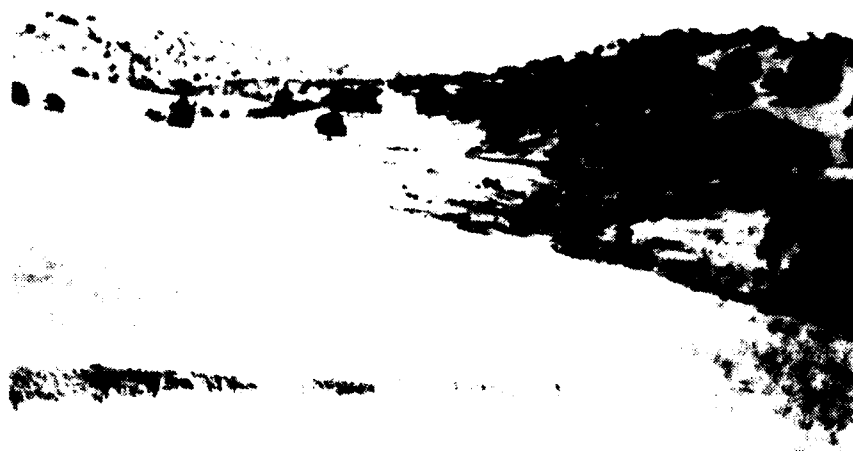
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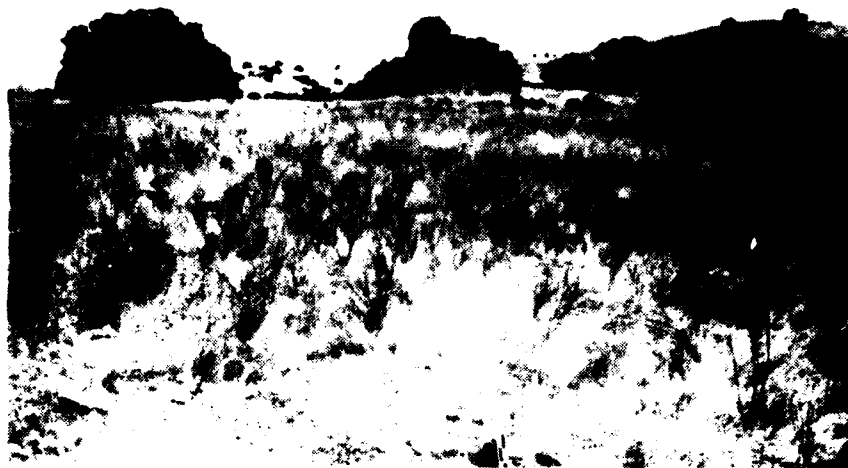
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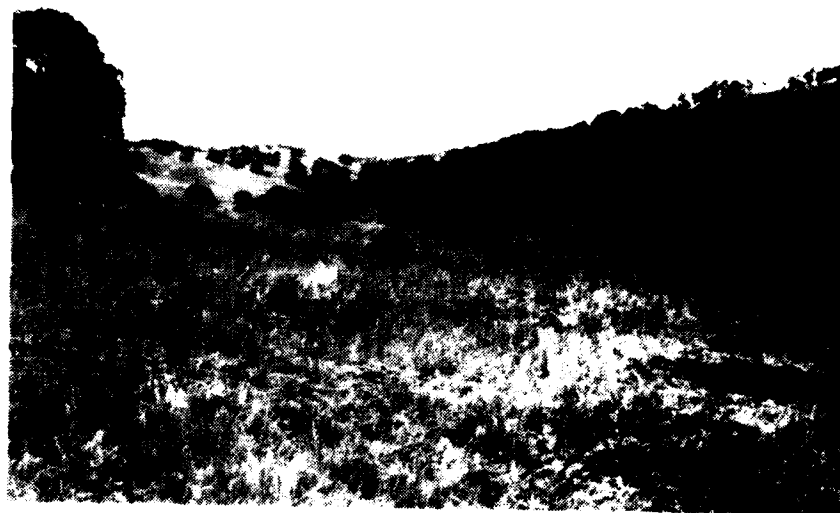
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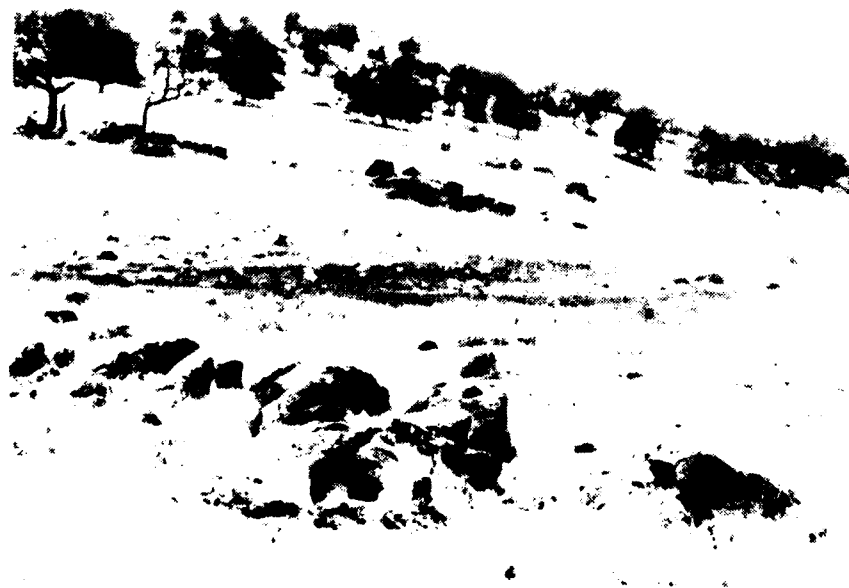
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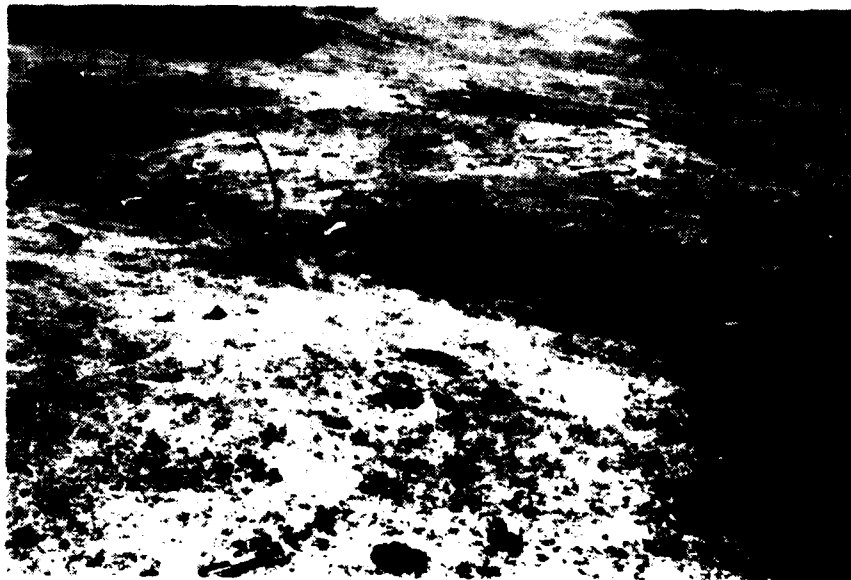
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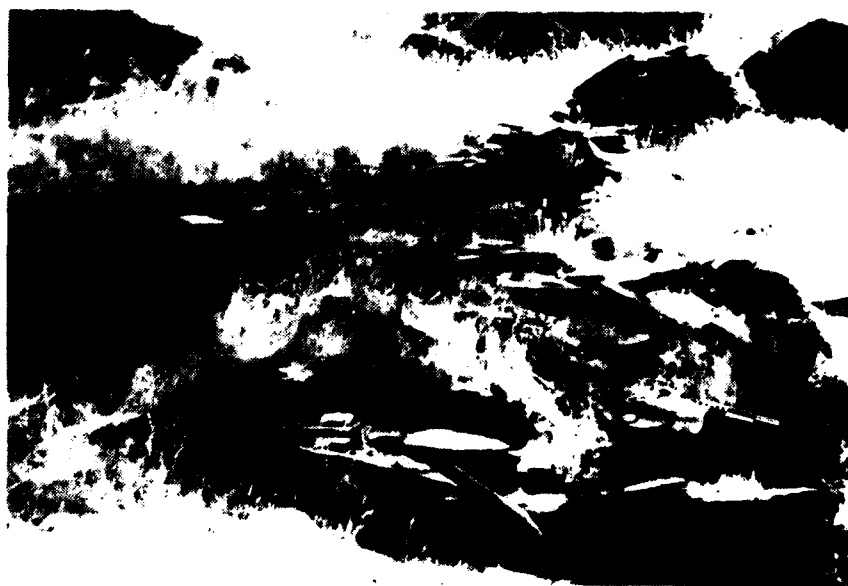
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APPENDIX 1

ETHNOGRAPHY, ETHNOHISTORY, AND HISTORY OF THE
MERCED COUNTY STREAMS PROJECT AREA

by

Jeanne Muñoz

with

Melinda Peak

INTRODUCTION

The Research

Standard ethnographic, ethnohistoric, and historic research was conducted to gather data for this part of the report. Published and unpublished documents, reports, records, and maps were examined at local institutions (libraries, historical societies, county offices); at California State University, Fresno (Woodward Special Collection); at the Stockton-San Joaquin County Public Library; at the California State Library, Sacramento; at the California State Historical Society Library, San Francisco; and at the Bancroft Library, Berkeley. Interviews were held with local historians, ranchers, Native Americans, and with professional colleagues with research interests and experience in the local area (see Appendix 2). Data were evaluated using standard criteria (see Haekel 1973).

Problems in Conducting the Research

Local data sources presented some very real difficulties. Research on the early years of Mariposa County was hampered by the lack of documents. The courthouse burned in 1854, destroying county records from 1849 to that date. In addition, a number of the early deed books are missing (Vols. E, F, H, I, J, K, L, and V). Tax assessment roll books begin in 1858 and have a continuous run from 1860 to the present. There are no map books to accompany the early records, and locational data are vague for the properties being taxed (a typical entry might be "Bear Creek"). Section and township information is first provided in 1871.

The Merced County Courthouse is currently undergoing interior remodeling, and the archival materials of the Merced County Historical Society, previously stored on the first floor of that building, have been removed to a storage facility and are inaccessible. Other county records (such as tax assessment

rolls) are in storage elsewhere, and keys to the storage facility are unavailable. The Historical Society's collection of prehistoric artifacts is also in storage. Access to these materials will not be possible before the first part of 1983.

There are a number of general histories available for Merced County (e.g., Elliott and Moore 1880; Outcalt 1925; Radcliffe 1940; Clark 1955; Graham 1957), and several particularized histories as well, such as the history of Atwater (Atwater History Club 1958), of LeGrand (Nolan 1972), of the Merced Irrigation District (McSwain 1978), and of Merced County schools and school districts (Merced-Mariposa Retired Teachers Association n.d.). There are no comparable general histories for Mariposa County, although a wealth of material exists on Fremont and there are a number of good accounts of the gold rush era (e.g., Collins 1949; Wood 1954) and on Yosemite. These sources, and material gained from interviews, were used to present a more complete picture than that afforded from primary archival data only.

Organization of the Data Gathered

The information gathered has been synthesized and is presented below in terms of historical themes.

EXPLORATION AND EARLY SETTLEMENT, TO THE 1840s

Exploration was minimal and had no great effect on the area other than the bestowing of such place names as Merced and Mariposa by the Spanish. The explorer Gabriel Moraga and his diarist Pedro Muñoz came through the area in 1806, failing to observe any Native American settlements. Other Spanish forays were made into the lower (or northern) portion of the San Joaquin Valley during the early part of the 18th century, and nearby Indians were removed to the missions. Land grants were made by the Mexican government in the 1830s and 1840s near, but outside, the Project Area. Jedediah Smith (and probably others) trapped furs in the 1820s and John Charles Fremont and Joseph Reddeford Walker explored in the 1840s.

NATIVE AMERICANS OF THE STUDY AREA

Identification of the Original Inhabitants

Anthropologists and ethnohistorians do not know with certainty the tribal identity of the early inhabitants of the Merced County Streams Project Area. No named villages are located within the Area (Kroeber 1925 Plate 37; Latta 1977 Endsheets; Levy 1978:400; Wallace 1978:462), and there is uncertainty as to tribal affiliation of some of the groups which

occupied nearby areas (Kroeber 1925:474). Merriam (1907) shows part of the area as Southern Miwok (Map 1), but Cook assigns the entire Project Area to the Southern Miwok (see Map 2).

Wallace (1978:462), on the other hand, assigns the downstream and plains portions of the area to the Yokuts, showing the Coconoon Yokuts on the north side of the Merced River, the Nopchinchí Yokuts on the west side of the San Joaquin River between the Chowchilla River and present-day Firebaugh, and the Chauchila Yokuts on the north side of the Chowchilla River. Kroeber states that the last-named group is "the last tribe [of Northern Valley Yokuts] until Stockton is reached, concerning whom anything definite is known" (1925:485). Personal extensive research (Muñoz 1976a, 1976b, 1980) and information from Castillo (1981), who has also conducted in-depth research on the area, does not support either Yokuts or Miwok occupation of the downstream and plains portion of the Merced County Streams Project Area during historic times; it does provide evidence of lack of occupation by any Native American group at least as early as 1806. (Archeological evidence may, of course, provide the necessary data to determine protohistoric occupation of the area; see Native Americans of the Project Area, below.)

It is possible that Northern Valley Yokuts occupied the plains and that Southern Miwok held the foothills of the area in prehistoric times, for Kroeber states, in a discussion of the western boundary of the Southern Miwok (1925:443) that

. . . it has sometimes been assumed that the Miwok ranged as rightful owners over the whole eastern and more fertile side of the lower San Joaquin Valley, but the evidence is nearly positive that this tract was Yokuts, and that the precise commencement of the first foothills marked the boundary between the two stocks.

Native Americans of the San Joaquin Valley, 1800-1855

A brief review of the history of the Native Americans of the San Joaquin Valley between 1800 and the end of the gold rush may help explain the uncertainty of tribal occupancy.

The historic era in California is usually said to start in 1769 with the Spanish overland exploration/missionizing expedition of Portolá and Serra. The first contact with Native Americans of the Project Area did not occur until 1806, when Gabriel Moraga, with Father Pedro Muñoz as his diarist, entered the San Joaquin Valley. The party camped on Bear Creek in Township 8 South, Range 10 East, on September 27 (Cook 1955a: 48), then explored to the north, discovering and naming the Merced and other rivers, returning south early in October. Cook (1960:284) notes:

. . . Moraga's party stayed close to the eastern edge of the valley. On the seasonal streams found in this area [including, it is assumed, Black Rascal, Burns, and Bear creeks] there was a distinct absence of permanent Indian settlements.

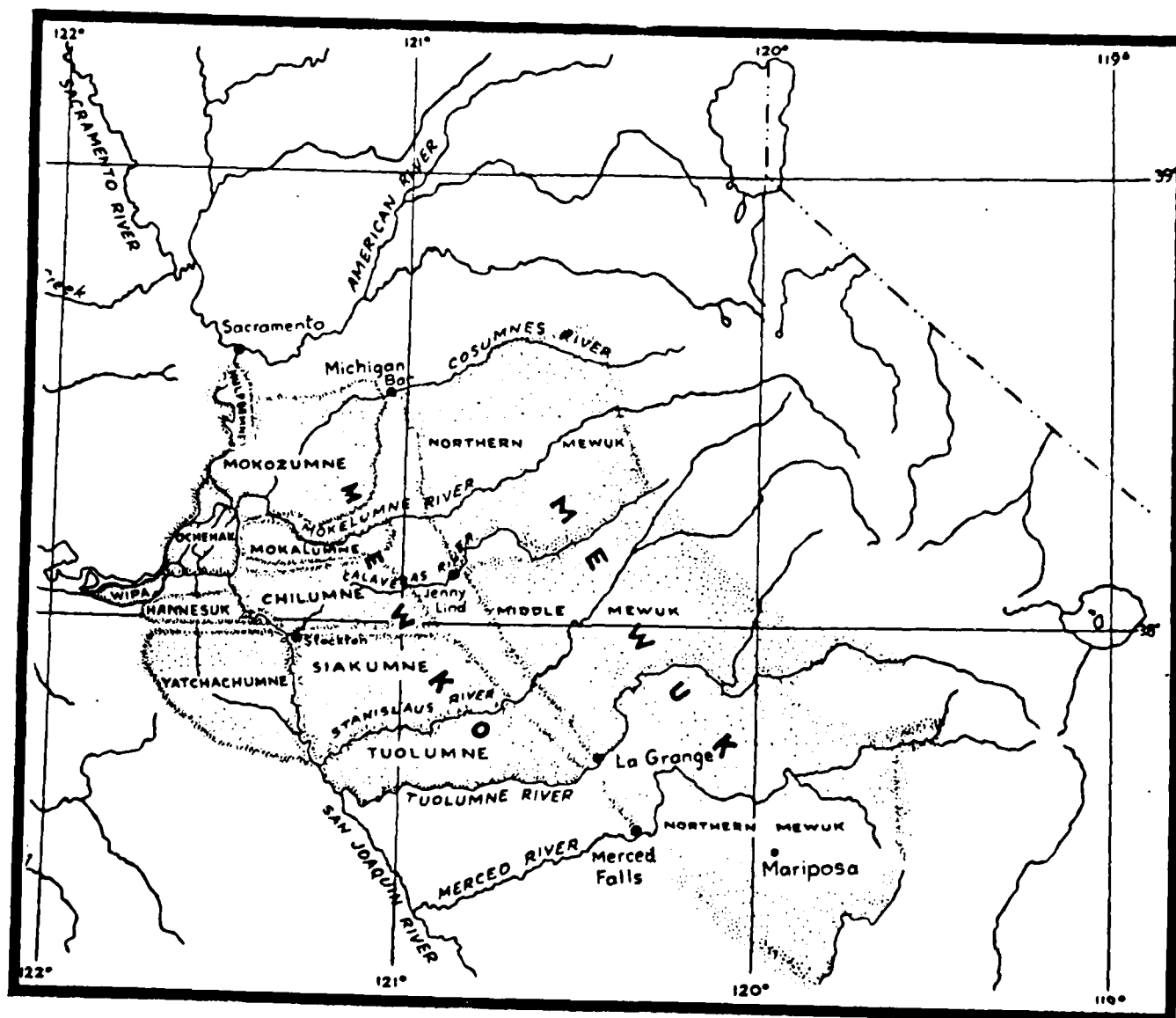
Many villages were noted, however, to the north (Merced River and beyond) and to the south (on the San Joaquin). It is possible, of course, that unobserved villages existed, perhaps upstream from Moraga's route, hidden from view by the foothills. It is even possible that Indians from the general area were later taken to one or another of the missions, as it is known with certainty that Nopchinchí Yokuts immediately to the southwest were taken in (Castillo 1981).

If unobserved villages did exist, or if the Area was populated after Moraga and Muñoz came through, the population may have been wiped out in the epidemic of 1830-1833, when malaria spread from Oregon through the entire Central Valley (Cook 1955b). Cook (1955, 1978:92) estimates that from one half to three quarters of the total native population of the Sacramento and San Joaquin valleys may have died in this epidemic. Perhaps present-day eastern Merced and western Mariposa counties were particularly hard hit, and the Area was deserted by the survivors, thus explaining the lack of description of the local Indians by Anglo Americans.

During the gold rush the Indians in the general area were further decimated (by one means or another) beginning in 1849 and particularly 1850 and, as a result, a reservation system was authorized by the U.S. Congress in an attempt to protect both Indian and non-Indian. The first treaty signed by Commissioners Redick McKee, G. W. Barbour, and O. M. Wozencraft and the "chiefs, captains, and head men" of various groups of Indians established the Merced River Reservation between the Tuolumne and Merced rivers. The name of one of the tribal groups represented in the treaty--the Coconoon--is described by Kroeber (1925:474) as uncertain as to its tribal affiliation, but is mapped by Wallace (1978:462) as a Northern Valley Yokuts group occupying the north bank of the Merced River near its juncture with the San Joaquin River.

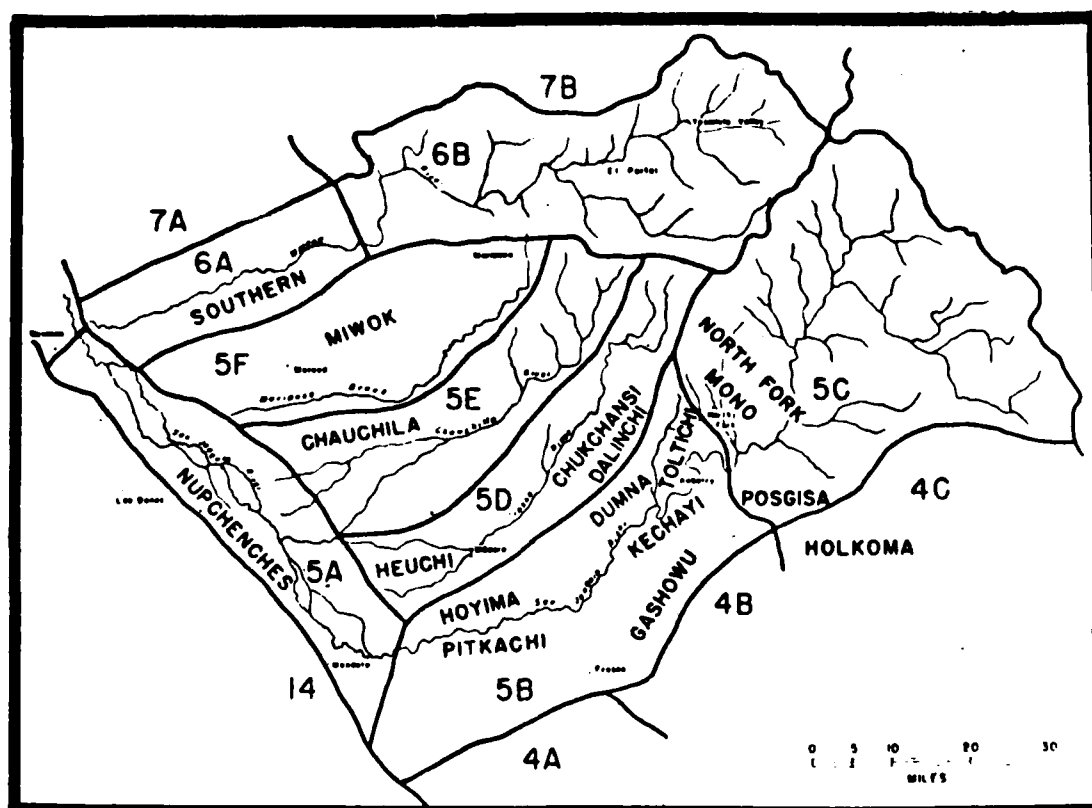
The names of other groups in the treaty do not appear in modern anthropological literature (except for Hodge 1907-1910), although some appear in various ethnohistoric and historic accounts. The "Po-to-yun-te," for example, are called "Potoyensees" by Ward in his 1851 account (Collins 1949:55-56), and are described by Ward as living near the trading post on the Merced River (close to present-day Merced Falls). In 1859, the Indian agent at the Fresno River Agency reported to the Commissioner of Indian Affairs that one hundred ten "Poto-en-cies" had "abandoned their native land, the Merced Valley and are now on the Chowchilla" (Lewis 1860). This is the location assigned them by Taylor on his map of 1864 (Heizer 1941).

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Map 1: Native Americans of the Merced County Streams Project Area, according to Merriam (1907).

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Map 2: Native Americans of the Merced County Streams Project Area, according to Cook (1955a).

Adam Johnston's map of 1852 shows "500 Indians" living on the "Merced River" (Map 3), but his accompanying report (Johnston 1853) does not provide locational data by tribal group or ethnographic description. Howard, in his reminiscences (Cossley-Batt 1928), provides ethnographic material, but mostly for Northern Miwok, even though he settled in Southern Miwok territory. Eccleston's diaries (1849-1854), written in the area, contain important ethnographic details, but tribal affiliation (other than either Yokuts of Miwok) is uncertain.

In sum, there are inadequate data to assign with certainty the Project Area to one or another specific Native American group. It may have been entirely Yokuts territory at one time, with Southern Miwok moving in after decimation and/or abandonment. The foothills may have been a transition zone, shared by both groups. Or the Yokuts may have held the plains, the Miwok the foothills. Or, more likely, it was unoccupied from some unknown time before 1806 until settlement by non-Indians.

Ethnographic Overview: Miwok and Yokuts

The sociocultural systems of the two groups which may have occupied the Area--the Miwok and Yokuts--were very similar (Gayton 1948:362), and it is therefore possible to describe accurately the putative aboriginal inhabitants of the Project Area even though their identification cannot be determined conclusively.

The Native Americans derived their subsistence from the abundant natural resources of the plains, foothills, and mountains (fish, game both large and small, grasses, seeds, tubers, fruits, berries, nuts), with primary caloric reliance on the grasses, seeds, and particularly the nuts (e.g., acorns) gathered by the women. Men hunted, and thus provided the more prestigious food--meat--and both men and women fished (Gayton 1948:185). Food was usually obtained within the recognized local territory of each cultural group, supplemented with food obtained during regularized seasonal trips into other areas. Trade with other groups for items not available locally was common (Davis 1961).

Permanent villages were sometimes as large as several hundred (Cook 1955a), and were kin-based in their sociopolitical organization. Residence was usually patrilocal, descent was patrilineal, and moiety or lineal exogamy was the rule (Gayton 1948: Gifford 1926). In some areas, one town served as the center of economic, political, and religious activities for smaller satellite villages (Merriam 1967). Caches of food, treasures, and other goods were maintained at the central town, and there were held important political meetings and religious ceremonies (Bean 1974:15). Each of these centers had one or more chiefs, men who were usually the heads of lineages.

Chieftainship was an inherited status, and chiefs were ranked according to the position of their lineage or according to linkage with particular totem figures (Gayton 1932:372-373; Merriam 1967:340, 347; Bean 1974:22).

Natural Setting of the Original Inhabitants

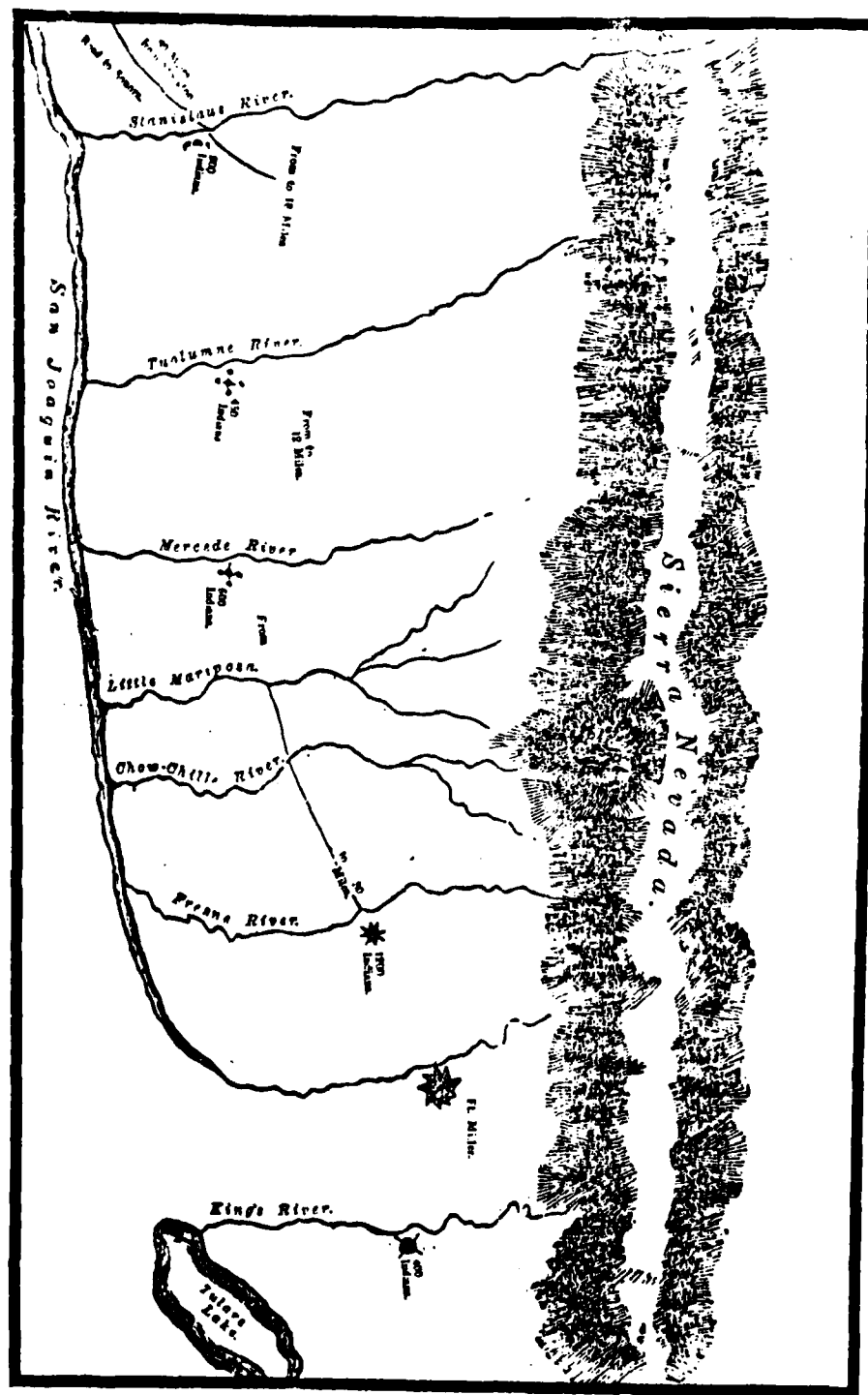
The territory occupied by the Northern Valley Yokuts and the Southern Miwok was part of the San Joaquin Valley and the adjacent foothills and mountains of the Sierra Nevada. The San Joaquin Valley extends some 280 miles north to south, from the Stockton Delta to the Tehachapi Mountains; the width of the valley averages 50 miles. The valley floor (the plains) is flat and virtually featureless except for waterways. In prehistoric times, the southern or upper portion of the valley was characterized by two major lakes, and sloughs, marshes, and deltas were throughout the entire valley. Two major rivers run parallel with one another from the Sierra, then diverge on the valley floor, the Kings to the south, and the San Joaquin to the north. Both are fed by smaller streams, most of which enter them, at right angles, on the plains. During heavy snow melt or excessive rains, the two river systems intermingled and much of the valley floor was inundated. Early observers reported on this condition, as the following description made by topographic engineer Lieutenant George H. Derby of conditions in the spring of 1850 illustrates:

We left the ferry . . . , and traveling southwest for 19.84 miles encamped on the edge of a swamp at a point about three miles above the mouth of Kings river and immediately opposite [an Indian] village. . . . I was anxious to cross the river and visit it, but was informed by the Indians, a large body of whom swam across to our encampment, that all the country in the vicinity was overflowed, and that it would be impossible to cross, even if we were to construct "balsas" of tule owing to the rapidity of the current. It was evident enough that the country was overflowed, and as I found it impossible for anything but an Indian to get even to the bank of the river, I was reluctantly obliged to give up my idea of crossing at that point (Derby 1850).

The wetlands, with their tules and marsh grass, contrasted with the rest of the plains, which were sparsely covered with vegetation most of the year. The Spanish priest, Pedro Moraga, stated in September, 1806, that:

From the point where we left the tule swamps to this place [Bear Creek] the land is really miserable. Salt flats and alkali patches, with innumerable ground squirrel burrows are all that one can see. . . . The forage was extremely scanty, and that the country appeared to have been burned

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Map 3: Distribution of Reservation Indians in the San Joaquin Valley, 1852 (Johnston 1852).

over by the Indians did not conceal the fact that the land is very poor (in Cook 1960:284).

Yet in the spring the valley can be beautiful:

It was the spring of 1851, and the San Joaquin Valley was in an absolute state of nature . . . upon each day's march the landscape presented a striking change of attractions in the flowers that overspread the ground. They alternated in color: one day the flowers were red, the next white, then blue and yellow. The atmosphere was clear and wholesome. . . . (Keyes 1884:234).

Animal life was abundant and varied. An observer in 1851 reported seeing

. . . a band of several hundred elk, and the motion of their antlers as the animals ran away was worth a journey across the continent to witness. Large troops of wild horses, many deer, antelope, and coyotes were constantly on view (Keyes 1884:234).

The horses had been introduced by the Spanish and were noted as early as 1806 (Muñoz in Cook 1960). Their numbers were increased in the 1830s, the indirect result of drought and consequent reduction of grain crops and natural forage in southern California. Ranchers and farmers were ordered by the Mexican government to kill their excess horses in an effort aimed at saving as many cattle as possible, but many chose rather to drive their stock into the San Joaquin Valley, intending to retrieve them at a later time. The animals multiplied rapidly, filling the entire valley (W. Smith 1939:165-166).

Other animal resources were fish (including salmon), mus-sels, turtles, migratory waterfowl, and smaller mammals and birds. Insects were numerous and varied, and large numbers of mosquitos bred in the wetlands.

The climate was as it is now--that is, relatively mild, but with excessively hot days (over 100°) in the summer and some very cold days (below freezing) in the winter. Rainfall (a scant 10-15 inches a year) is concentrated between November and April, and there are cyclical droughts and floods. "Tule" fog of zero visibility may be held at ground level by atmospheric conditions for days.

Contemporary Native Americans

None of the eight Native Americans consulted (see Appendix 2) knows the ethnic identity of the original inhabitants of the Merced County Streams Project Area, either for precontact or early historic times. None of them knows of any specific

village site (other than what they have learned from recent archeology), of gathering sites, or of sacred sites in the area. All of them are interested in the findings of the Project and expressed the desire to visit sites during survey or test excavations.

Native Americans throughout California (and other states as well) are concerned about the treatment of burials found through archeological research, and Indians of Merced and Mariposa counties are no exception. They are concerned about all Native American burials, no matter the time depth and no matter how distant the genetic relationship. They prefer that any skeletal material found in excavation be covered back over and that the grave goods remain with the body. They are usually willing that in situ measurements, sketches, and photographs be made. If the burial will be disturbed or destroyed in construction, reburial is a possibility but is an unhappy compromise, expensive to the Native Americans financially, spiritually, psychologically, and emotionally.

ECONOMIC, SOCIAL, COMMERCIAL, AND DEVELOPMENT HISTORY

Mining Frontier

The Southern Mines opened up late in 1848 in the Tuolumne River area, and gold mining camps rapidly sprang up along streams and rivers throughout the Sierra Nevada foothills, spreading as far south as the Fresno River by 1850. Men relocated frequently, individually and collectively, in response to stories of richer diggings elsewhere. The earliest camps were laid out haphazardly and until the late 1850s the majority of the houses were built of wood framing and canvas walls, partitions, and roofs. By the late 1850s, cabins with log or board sides, a mud and stone fireplace, and canvas roof came to be standard (Paul 1947:75).

Supplies were brought in from Stockton over what came to be called the Stockton-Millerton Road. The road ran east from Stockton to the foothills, then followed closely the edge of the hills (to avoid the often impassable wetlands), passing through Knight's Ferry, La Grange, Merced Falls, Union (a post office of the late 1800s located in the Northeast $\frac{1}{4}$ of Section 2, Township 8 South, Range 16 East, U.S.G.S. Owens Reservoir Quadrangle), Newton's Ferry (on the Chowchilla River), and ending at Fort Miller (later Millerton) on the San Joaquin River. The road marks the boundary between Merced and Mariposa counties and is visible today at the intersection of the county line and Highway 140. The quantity of freight hauled on the road was immense, and large freighting businesses were built up. Hundreds of men and thousands of mules and horses (and a few oxen) were employed, and numerous stopping places (usually a

ranch, sometimes a hotel, plus stables and corrals) were necessary for overnighting. The nearest regular stopping place to the Project Area may have been Howard's Ranch, about one mile from Burns Reservoir, in Section 36, Township 5 South, Range 15 East, U.S.G.S.

Trading centers or towns developed throughout the mining district, the nearest to the Project Area being Indian Gulch (Section 3, Township 6 South, Range 16 East, U.S.G.S. Indian Gulch Quadrangle), approximately five miles north of Bear Creek Reservoir.

Placer mining in the Project Area was short-lived, and no quartz mining claims were made in the Merced County Streams Project Area.

Cattle and Sheep Frontier and Development

Cattle ranching. Cattle ranching became an increasingly important economic activity in the Merced County Streams Project Area from the early 1850s on. The early ranchers grazed their stock on government-owned land, purchasing, by gaining a patent or official conveyance, relatively small (compared to the numbers of acres actually used) parcels of land for ranch headquarters. This practice continued for several years.

Warrants for military bounty lands were made assignable in 1852, and "their principal use in California began from that date" (Robinson 1948:182). These warrants entitled the holders to 160 acres (a quarter section) of any public land in the United States valued at \$1.25 an acre; if valued at more than \$1.25, the difference could be made up. Many who took advantage of military warrants were speculators, and quickly turned a profit on their "investment."

After 1853, some land was acquired through preemption--i.e., the preferred right of purchase given actual settlers. After May 20, 1862, when President Lincoln signed the first Homestead Act, free land for actual settlers became available.

Under the Homestead Act of 1862 settlers could acquire farms of 160 acres from unappropriated [i.e., public] lands free of all charges except a nominal filing fee to be paid when application was made at the proper land office. Five years of residence and cultivation were required of the settler before he would be entitled to a certificate or patent from the United States. The privilege of commuting was also permitted--that is, of converting the homestead with a preemption right and paying the regular price per acre (Robinson 1948:168-169).

All of these methods of land acquisition were made use of by cattle ranchers in the Project Area.

The foothills along the county line were and are unsuited to farming (except for some non-irrigated grain crops), and cattle ranching continues to be the primary economic activity there. Ranch headquarters were built for each ranch, with house, barn(s), shop(s), corrals, scales, wells, etc., located in one complex (as at Burns Creek Reservoir) and with other buildings, corrals, watering troughs, holding pens, etc., at strategic locations on the property.

Sheep ranching. Sheep ranching began in the Merced County Streams Project Area at least as early as the late 1850s. One of the first sheep ranchers was Cyrill C. Smith, who arrived in California early in 1852, joining his brothers, Pardon and Dorillus, in gold mining at Woods Crossing. Cyrill took time to help with harvesting in June of 1854:

I have been down twenty miles towards Stockton a haying on dry creek valley. The best wheat and barley grows there I ever saw[;] the hay is mostly wilde [sic] oats from one to two tons per acre. The most splendid Country I ever saw (C. Smith 1854).

This experience may have influenced him away from the mines, for at least as early as 1859 Cyrill, Dorillus, and James (another brother) were raising sheep.

I am at work for Cyrill & Dorillus attending a band of sheep for them. We live about four miles N.W. from La Grange and Eighteen S.W. from Jamestown . . . there are about seven or eight hundred in this band. They have moved the other band of about eighteen hundred over the river about six miles for better food (J. Smith 1859).

The Smiths were sheep ranching in the general Haystack Dam area by 1872 and, according to the Merced County Assessment Roll, they owned 5,000 sheep valued at \$7,500 and 11,000 acres of land valued at \$13,750. Improvements on the land must have been minimal as they were evaluated at \$50.00. This land was northwest of the Haystack Dam area, but by 1881 C. C. Smith owned all of Section 19 (directly in the proposed Haystack Dam area), the North $\frac{1}{2}$ of 20, and the West $\frac{1}{2}$ of the Northwest $\frac{1}{4}$ of 29 (Merced County Assessment Roll, 1881). His stock had increased to more than 17,000 sheep, and his other taxable possessions indicate that he was very successful:

2 watches	\$100
furniture	200
sewing machine	25
52 tons grain	780
3 wagons	175

2 harness	\$ 25
3 American horses	300
2 colts	50
11 half breed horses	295
3 dozen poultry	10
1 mule	20

By the time of Cyrill Smith's death, he owned 30,000 acres. These were inherited by his son, Elmer D. Smith (Aucutt 1933), including holdings in the proposed Haystack Dam area (Official Map of Merced County 1909).

J. W. Mitchell was another early sheep rancher in the Merced County Streams Project Area. Mitchell bought thousands of acres of land in the San Joaquin Valley at \$1.25 an acre, and at one time he owned more than 100,000 acres in Stanislaus and Merced counties (Mitchell 1877), including land at and near proposed Castle Dam

Next he bought thousands of head of sheep to pasture off the wild grass, weeds and brush that grew on his land. He also bought thousands of head of horses and cattle (Atwater History Club 1958:20).

Sheep were also raised in the Burns Reservoir area (e.g., by John B. Bennett), but sheep ranching did not continue to thrive as did cattle ranching. Those areas in and near the foothills which had been used for sheep ranching became cattle grazing areas or supported grain (dry) agriculture. Those areas farther out on the plain were converted initially to grain agriculture, later to irrigated crops.

Farming Frontier and Development

Dry farming. Farming began in the Merced County Streams Project Area in the early 1850s. Agriculture was a challenge to the new settlers, who were unfamiliar with dry farming, knew little if anything about irrigation, and had bad luck as well. In 1854, for example, smut, drought, and insects created problems with crops throughout the San Joaquin Valley (Alta California 1854), but knowledge gained from experiments in the northern part of the valley with dry farming, with types of wheat suited for the climate, and with farm machinery made possible the development of farming on a large scale.

Farmers moved into the area in increasingly large numbers, gaining patents to the public land and planting grains. Disputes between farmers and ranchers were not uncommon, occasioned by crop damage and/or destruction by cattle. The ranchers insisted that the farmers were responsible for fencing the cattle out; the farmers insisted that the ranchers were responsible for fencing the cattle in.

Cattle were very troublesome, and had to be herded night and day to prevent their encroaching on the fields and destroying the growing grain (Lewis Publishing Company 1892:74).

The ever-increasing farmer population became politically powerful and in 1874 the "No Fence"--meaning the farmers did not have to fence--law was passed.

Grain was grown in and near the foothills and in the downstream and plains areas also. In the Castle Dam area, e.g., J. W. Mitchell's sheep cleared his land of ground cover, following which he encouraged others to dry farm it, renting it out in 2,000-acre parcels. He built a house for each tenant and furnished them with plows, grain seeds, wagons, and farm machinery. He himself also grew grains.

Intensive agriculture. Wheat and other grain farming, along with cattle ranching, continued to be the main economic activities of the eastern Merced-western Mariposa counties areas through most of the 1880s, but the development of an irrigation system by Crocker Huffman Land & Water Company in 1888 made possible intensive agriculture and resulted in further changes in the area beginning about 1900. Numerous crops were introduced, including fruit and nut trees, vegetables, and cotton. Dairy farming developed with the introduction of irrigation and the assurance of adequate feed. Turkeys were found to do well in the area.

Railroads, Other Transportation, and Communications

Railroads. The railroad came to Merced County in 1872, resulting in diminished use of the Stockton-Millerton Road. Bridges were built across creeks, and freight was hauled by wagon and team from the railroad line to the plains and hills to the east. Complaints were made of farmers who changed the routes of roads "to suit their own convenience or whim," and, as a result, some of the bridges were left without roads to connect them (Outcalt 1925:308).

The importance of the railroad in the changing economy of the Project Area cannot be overstated. The population of the mining country of the foothills had dwindled by the 1870s, and the major market was to the north, in San Francisco, from whence agricultural products were shipped worldwide. The railroad provided reliable, satisfactory transportation, and was thus an impetus for intensive agriculture development.

The railroad had another effect on the growth and development of the area. It advertised the "health, wealth, and prosperity" attainable in California, and offered low fares to get here. Land was still easy to obtain, and many of the earliest

arrivals (by train and otherwise) became large landholders (i.e., over 5,000 acres).

Towns developed in the area with the coming of the railroad (only Plainsburg predated the railroad, and it diminished in importance once the system was in operation), and increased in size as the rural population increased. The population of Merced County grew from 8,085 in 1890 to over 15,000 in 1910 and more than 25,000 by 1920. Part of this growth was the result of divisions of land into colonies or other subdivisions. The first attempt to establish a colony (for Hollanders on 4,000 acres near Lake Yosemite) was a failure, as were some of the others, but most were distinct successes, contributing to the development of intensive agriculture and to the increase of population as well--and all of this an outgrowth of the railroad system.

Other transportation. As noted above, the only established route of transportation into the Merced County Streams Project Area prior to the railroad was the Stockton-Millerton Road. It ran east from Stockton to the foothills, then south above the seasonal wetlands. The Stockton-Millerton Road continued to be the most important route of transportation until the early 1870s.

Other roads were created in the early days by the simple process of dedicating a more or less indefinite strip of country to travel. The line was made definite upon the ground by traveling over it, but in the case of washout and ruts the travelers pioneered a new route alongside the old one. There was plenty of land, and for the most part it was public land, and was used only for cattle range, except the comparatively small areas along the river and creek bottoms (Outcalt 1925:307).

After the railroad was established on its north-south route, east-west roads developed from the railroad tracks to the foothills.

Communications. During the gold rush, mail arrived once a month. It was carried into the Southern Mines by the express service of Reynolds & Company, bought out by Wells, Fargo & Company, which built an office in Hornitos in 1854 (Chamberlain 1972:52), and charged \$5.00 for the delivery of a letter from San Francisco (Clark in Chamberlain 1972:19).

The railroad system established in 1872 greatly improved mail service and other contact with the rest of the United States.

Settlement

Settlement pattern. Settlement during the gold rush was in the foothills, along streams and rivers. Mining camps were often short-lived, as were trading centers or towns. Population density was high in the mining areas until about 1860. By that time, many miners had grown discouraged at their meager earnings and had either returned home or found other ways to earn a living. Often the new work was related in some way to providing food, drink, mail, or supplies to the miners. Trading posts were set up, express services provided, and teams and wagons hauled in machinery (stamp mills, for example), building materials, etc. Some moved westward and became cattle ranchers.

Merced County was formed out of Mariposa County in 1853, and the Stockton-Millerton Road became the county line. For many years the bulk of Merced County's residents lived in the area near that line.

Scarcely too much emphasis can be laid upon the very close connection which existed between the new county, with its activities creeping out into the big plain of the San Joaquin, and the mother county in the hills. The new county was creeping out onto the big plain of the San Joaquin, it is true; but its markets, its associations, the former dwelling-places of many of its people, a large part of its social connections, and numberless other bonds were across the line. The activities of the two counties were different in character from the beginning, from the very nature of their topography; but in many important respects they formed one community. The very line which divided them politically from 1855 on, the Stockton and Millerton Road, the main (indeed the only) artery of travel between north and south, was a bond of union rather than a barrier (Outcalt 1925:163).

The primary activity "creeping out" into the San Joaquin Valley was cattle ranching, and the settlement pattern of the 1850s and 1860s reflects this. The Merced County Assessment Roll for 1857 shows that most of the population was located along the Merced River from Merced Falls out onto the plains almost as far as the San Joaquin River, and along creeks from Burns and Bear to the Chowchilla, here stretching no farther onto the plains than about half way to the San Joaquin.

Apparently the general pattern for the east side [of Merced County] in these early years of settlement was for the young miner to come down from the gold fields, establish a residence and ranch, and run it alone or in partnership with another man. Eventually he would feel the need to begin a family and would return to his former home to find a wife. Having done so, both would return to California to settle permanently (Graham 1957:41).

The settlement pattern in the foothills continued during the grain farming era, though the pattern of land ownership, of necessity, changed. Increasing numbers of new settlers (some from the mines, many from outside the state) arrived to reduce the plain between the foothills and the San Joaquin River to private ownership and to try their hand at farming. The farms were smaller than the cattle ranches, although some of them became very large later on, and the farm population density was higher.

The actual distribution of the population is impossible to determine for this era as the 1880 census data are not divided into units smaller than a county, but Graham (1957:60-61) has correlated soil types with impressions of "old timers," and concludes the following:

It appears that at the center of the favored piedmont alluvial plain, farmhouses were located on almost every section; in other words, there was about one house to the square mile. On the margins of this belt, the farmhouses became fewer, averaging one farmstead to every two or three square miles. Once outside those areas where wheat farming was carried on, the population became truly sparse.

Merced County population increased dramatically following the coming of the railroad. The 1870 census shows 2,807 individuals living in Merced County, most of them on the east side. By 1880, the population was 5,656; by 1890, 8,085. It is in the areas of intensive agriculture (i.e., mostly the alluvial plains) that population increased the most.

The 1900 Merced County census shows an increase in population to almost double that of 1890, and during each decade after that it increased between 40 and 60 percent. By 1950, it was about 77,000, most of it the result of urban growth.

The population of that portion of western Mariposa County which is part of the Merced County Streams Project Area has gone through the same changes as that of contiguous Merced County.

Ethnic composition. During the early days of the gold rush, most of the miners were from the eastern and southern United States, and were young and single. An analysis of the 1857 Assessment Roll for Merced County shows that:

With the exception of a very few Spanish names . . . the names are practically all American of the sort that were brought from England (Outcalt 1925:156).

Italians are reported in the Mariposa (town) area in 1849 (Reynolds in Chamberlain 1972:15), and at Indian Gulch sometime thereafter ("Old Timer," in Chamberlain 1972:153-154), and 82 blacks and 1,571 "foreign residents" are recorded in the 1852 state census (Alta California, November 12, 1852).

The picture was probably little changed in the 1860, although this is difficult to determine as the 1860 federal census does not record state or national origin.

The 1870 census shows 2,807 individuals living in Merced County, 611 of them foreign born (Outcalt 1925:299). By 1880, the population was 5,656, 1,700 of whom were foreign born. In 1890 it was 8,085, with over 2,000 foreign born. Most were from China (597), next Ireland (265), then Germany (177), British America (121), Mexico (110), England and Wales (93), France (59), Scotland (38), and Sweden and Norway (27). The bulk of the population during these decades was male (Outcalt 1925:299-300). The first Japanese, Portuguese, and Italians are identified in the 1900 census. The male-female ratio of the native born population was closer to even (3,941 to 3,079) than before, but that of the foreign born was still predominantly male (1,703 to 492) (Outcalt 1925:301).

Ethnic diversity continues to the present day, as is demonstrated by the numerous ethnic organizations listed in the local phone book.

POSSIBLE EXPLORATION OF THE PROJECT AREA

Early Exploration of the Project Area

The Advisory Council on Historic Preservation recognizes that studies focused on the "lines of march, stopping places, and landfalls of early explorers" are legitimate research concerns (Advisory Council on Historic Preservation 1980:37-38). Cook (1955a) has established the route of the Moraga Muñoz expedition to a large extent, and full-scale research on that expedition does not seem warranted. Archeologists should, however, keep the expedition in mind during test phase and mitigation procedures.

The route of Jedediah Smith through the general area in the late 1820s is a matter of dispute (see Fletcher 1924, Merriam 1923 and 1924, on this), and material remains recovered archeologically which appear to fit into the 1820-1830 period should be carefully analyzed.

Native Americans of the Project Area

Ethnographic and ethnohistoric data on the Native Americans of the Merced County Streams Project Area are lacking, and it appears that the Area was unoccupied at least as early as 1806. Archeological research should be conducted to determine, to the extent possible, who the late prehistoric residents were (if

any), and why they abandoned the Area. It is known from previous archeological studies that the material culture of the Yokuts and Miwok differs, and archeological evidence might provide data on the following:

Who lived at each of the four specific project areas in late prehistoric times?

Were the foothill/plains areas a transition zone between the two groups?

Was early historic contact made but not recorded by the Spanish?

Did the population die as a result of war or disease?

Were the Chauchila to the south, who had a reputation for being warlike, responsible for the lack of occupancy of the area?

Anglo American Era

The gold rush. The early records for the Merced County Streams Project Area are missing (i.e., those prior to 1854), diaries by gold miners do not provide Project Area-specific data, and there are therefore many gaps in the early historic record. Archeology can help fill these gaps.

Remains of architectural structures (tents, plank or log tent cabins, rock houses with canvas roofs, etc.) provide relative chronological data for the occupancy of an area by gold miners, traders, etc. The areas for Burns and Bear creeks reservoirs should be examined most carefully for such remains, particularly the more ephemeral evidence of tents, tent cabins, and/or tent "cities." This may make possible a partial reconstruction of the early history of the westernmost portion of Mariposa County. Architectural style is evidence also of cultural affiliation or influence, and the inadequate census records may be "fleshed out" by the careful study of architectural remains.

Evidence of Indian-white contact should be sought. Miners often employed Indians, especially in the early years of the gold rush. If, indeed, the Merced County Streams Project Area was abandoned by Native Americans as early as 1806 (and the evidence for this is very strong), the reintroduction of Native Americans, whether California Indian or otherwise, may be easily discernible in the archeological record.

It is possible that data on the Project Area during the gold rush can be derived from early newspapers, but there are problems here. The Mariposa Gazette, established in 1854, has had one of the longest continuous runs of California newspapers. The courthouse in the town of Mariposa has copies of the entire run of papers available for research. The paper has not been indexed in any way, and use of the papers without a locational

name is virtually impossible. Even a page-by-page reading of the paper may not yield specific information on the relatively remote portions of Mariposa County.

Nonlocal papers, such as the San Joaquin Republican and Alta California, were often vague on locational data, and it is hard to predict how much area-specific information they might yield. Examination of newspapers is very time-consuming, and the amount of data to be recovered is unpredictable. Recommendation of research of early newspapers does not seem warranted.

Ranching, farming, and intensive agriculture. The economy of the post-gold rush Merced County Streams Project Area followed the same stages of development as did the rest of the San Joaquin and Sacramento valleys (i.e., cattle and sheep ranching, non-irrigated farming, intensive agriculture, and urbanization), although the timing was not synchronous throughout the entire Great Central Valley. The chronological differences have been ascribed to a variety of "causes," and it would be interesting and valuable to investigate these. Answers to the following questions should give a clearer picture of the economic development of the Project Area, of the San Joaquin Valley, and of the Central Valley.

What role did Spanish and Mexican land grant titles play in the economic development of the Project Area as compared with the San Joaquin Valley and the Great Central Valley?

Where were the early cattle/sheep ranchers from, and what in their cultural background (if anything) led them to be ranchers instead of farmers? (And the converse.)

Was the choice of location of ranch headquarters culturally influenced or was it a function of natural resource distribution?

Does the location of ranch headquarters provide evidence that many early ranchers were from the southern United States (i.e., did they build on the "crick bottoms"?)

Do the first crops provide evidence of place of origin of the early farmers?

What role did ethnic minorities play in the economic development of the Merced County Streams Project Area?

Some of these questions can be answered through archival research findings, some through archeological research findings. The answer to the last question, for example, may be found in incorporation papers and ledgers of early ranches and farms. The ledgers often include names of farmhands, their places of dwelling, duties, wages, and other details of everyday living. Since the Advisory Council on Historic Preservation (1980:58) recognizes that the "contribution of those groups that wielded little economic power, and that were often illiterate, at least

in English, to the history of the Nation and its regions are often poorly documented," records concerning them are worthy of serious investigation.

The railroad and urbanization. Since neither the railroad nor urban development existed directly within any of the four dam/reservoir areas (although railroad lines formerly ran just outside the Castle Dam area), it seems unwarranted to suggest research questions related to either the railroad or urbanization.

SITE-SPECIFIC HISTORY: BEAR RESERVOIR

Bear Creek Reservoir impacts Sections 22, 27, 33, and 34 of Township 6 South, Range 16 East, U.S.G.S. Quadrangles Indian Gulch and Owens Reservoir. Evidence that placer mining occurred in the area is readily obvious by tailings, etc. Evidence that a trading post was set up to serve the miners is not so obvious, but on September 9, 1854, a license was issued to Eccleston and Seely to set up a trading tent four miles south of Indian Gulch, which would have put them inside the Bear Creek Reservoir area. This may be Robert Eccleston, who had come to California some years before, had mined for a time, and then served in the Mariposa Battalion under Major James D. Savage during the "Mariposa War" (a campaign to bring reluctant Indians in to negotiate a treaty) in 1851. He had moved to Marysville by 1854 (Eccleston, Vol. 8, n.p.) and thus he may have been an investor in the trading post rather than an active, working partner.

The first patent for Bear Creek Reservoir land was obtained in 1867 by Robert Simpson, Jr. This and subsequent patents are shown in Figure 1. It should be kept in mind that the figure does not show land holdings as they were at the time of the last patent issued--i.e., 1911. There was much selling back and forth of property in the early 1870s, and large ranches began to form in the late 1870s. The Grade, Cunningham, Ryan, and Pate ranches, for example, are all shown on the Official Map of Mariposa County for 1897 (Figure 2).

William A. Grade, a pioneer merchant of Mariposa, began buying ranch lands to the north of Bear Creek in 1877, eventually acquiring

10,000 acres of land in Merced County, where he raises cattle, hogs and sheep. At one time he devoted his time to the culture of cotton, planting 200 acres to this product; he realized 400 pounds to the acre, for which he received thirteen cents a pound (Lewis Publishing Company 1892: 2504).

Grade began leasing his land to D. I. Waltz, who bought the ranch from Grade's son in 1925. The Waltz Ranch is shown on the most recent U.S.G.S. Quadrangle, Haystack (1962).

Cunningham Ranch was to the south of Bear Creek. The illustration on the following page (Figure 3) shows a view of the Cunningham Ranch, looking to the north/northeast, with the Ryan Ranch in the background.

The Ryan Ranch was owned by James and Louisa (Pate) Ryan. Figure 4 shows the ranch house, looking toward the north/northwest, with the location of present-day Bear Creek Dam in the background. The barn is still standing and is visible from Highway 140 (Pinkerton 1981).

Francis Marion Pate had come to California in 1849, mined "with indifferent success" for six years before he began farming and raising stock (Elliott and Moore 1881:122). He settled on one quarter section, and later bought it under preemption rights. He purchased 3,000 more acres, which his son, Stephen M. (Doc) Pate, later bought, adding an additional 2,000 acres (part of the Bennett Ranch). Here he raised mules, horses, and sheep until 1917, when he sold part of the property and moved to Le Grand (Outcalt 1925:526-528).

Bear Creek may have served as a route to the Agua Fria area during the 1870s.

If one, coming from Agua Frio [sic] after delivering many hogs to the thousand Chinese miners who still clung to the placer man's pan, wanted to get to the Stevinson ranch, he might follow Bear Creek down from the hills, and having come to the plains, see off through the mirage of summer a clump of trees. . . . (Merced Evening Sun 1922).

At this point in time, it is impossible to determine the time at which the stone structures within the reservoir area might have been built, other than to say possibly as early as the gold rush. Structures of stone or adobe came to be built chiefly in response to the danger of fire, and the materials used and the method of construction varied according to materials available and the cultural background of the builder. Schist, which fractures into horizontal slabs easily and requires little, if any, dressing, was readily available in the project area and was used by the Italians--the "stone masons par excellence" of the gold field--to construct schist and mud mortar structures (Heizer and Fenenga 1948:93, 94; Fenenga 1981).

Coursed rock walls are usually attributed to the Chinese, but upright slab "walls" or enclosures are not known to exist outside the Bear Creek area, and their source and use are unknown (Fenenga 1981).

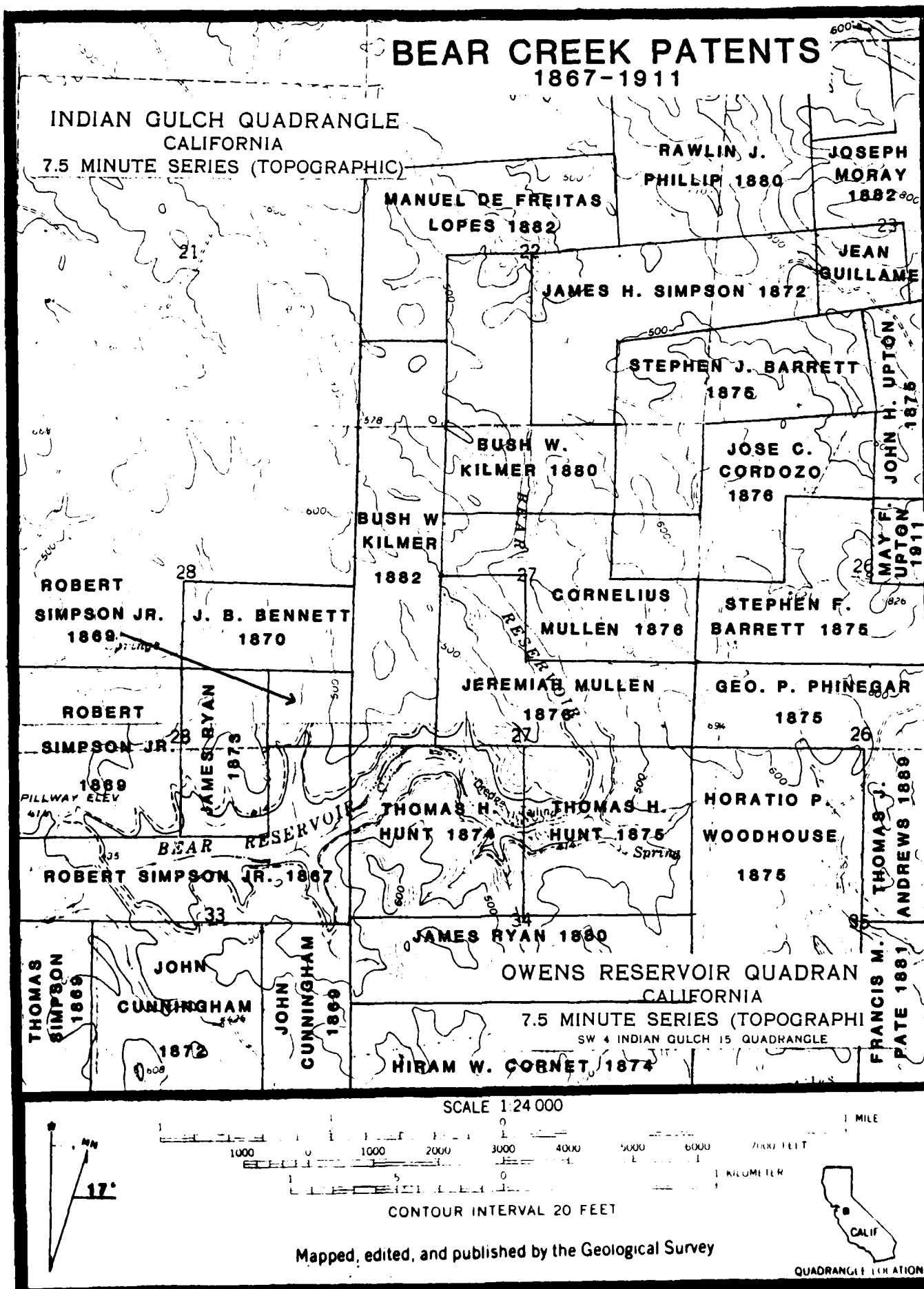
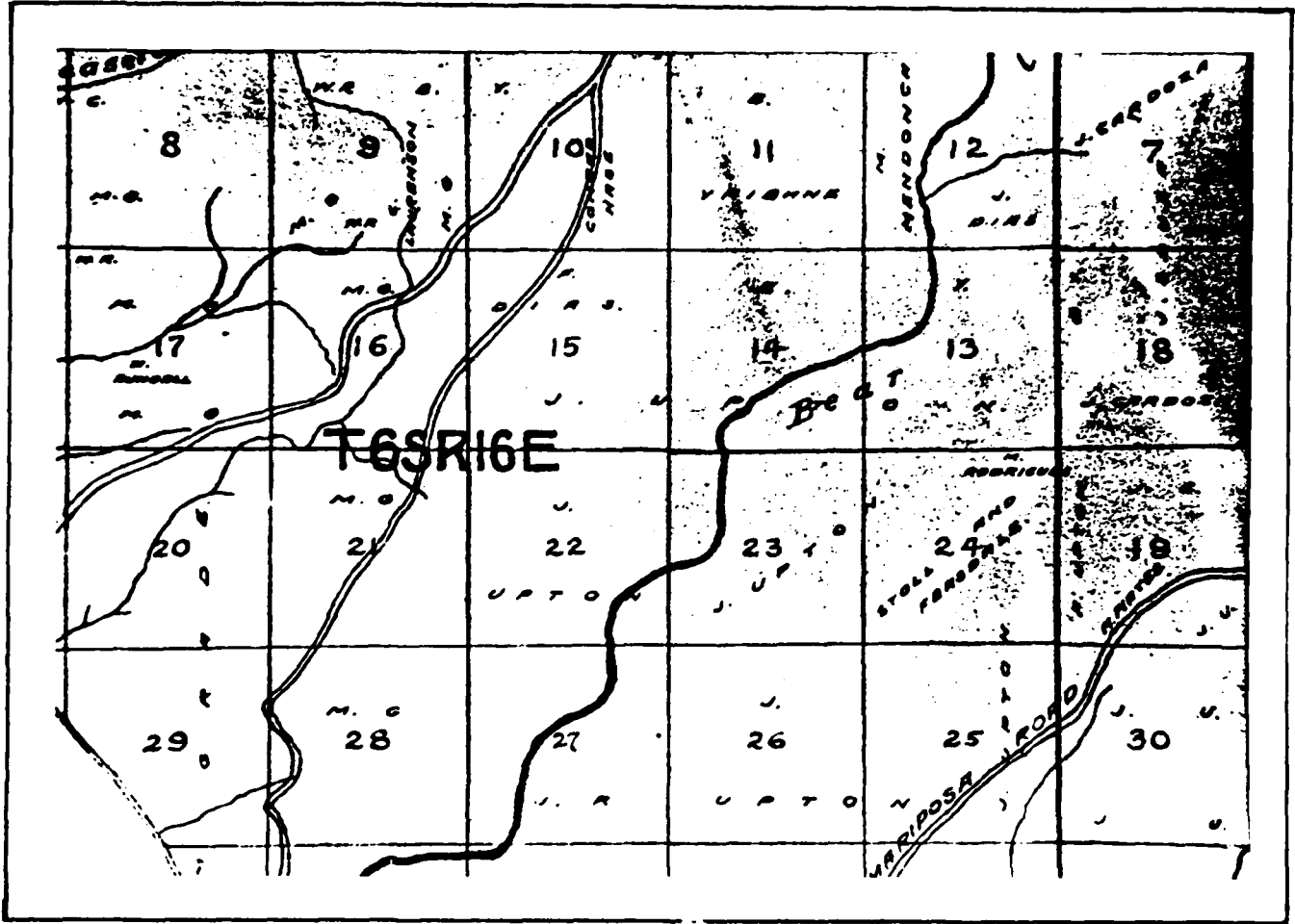


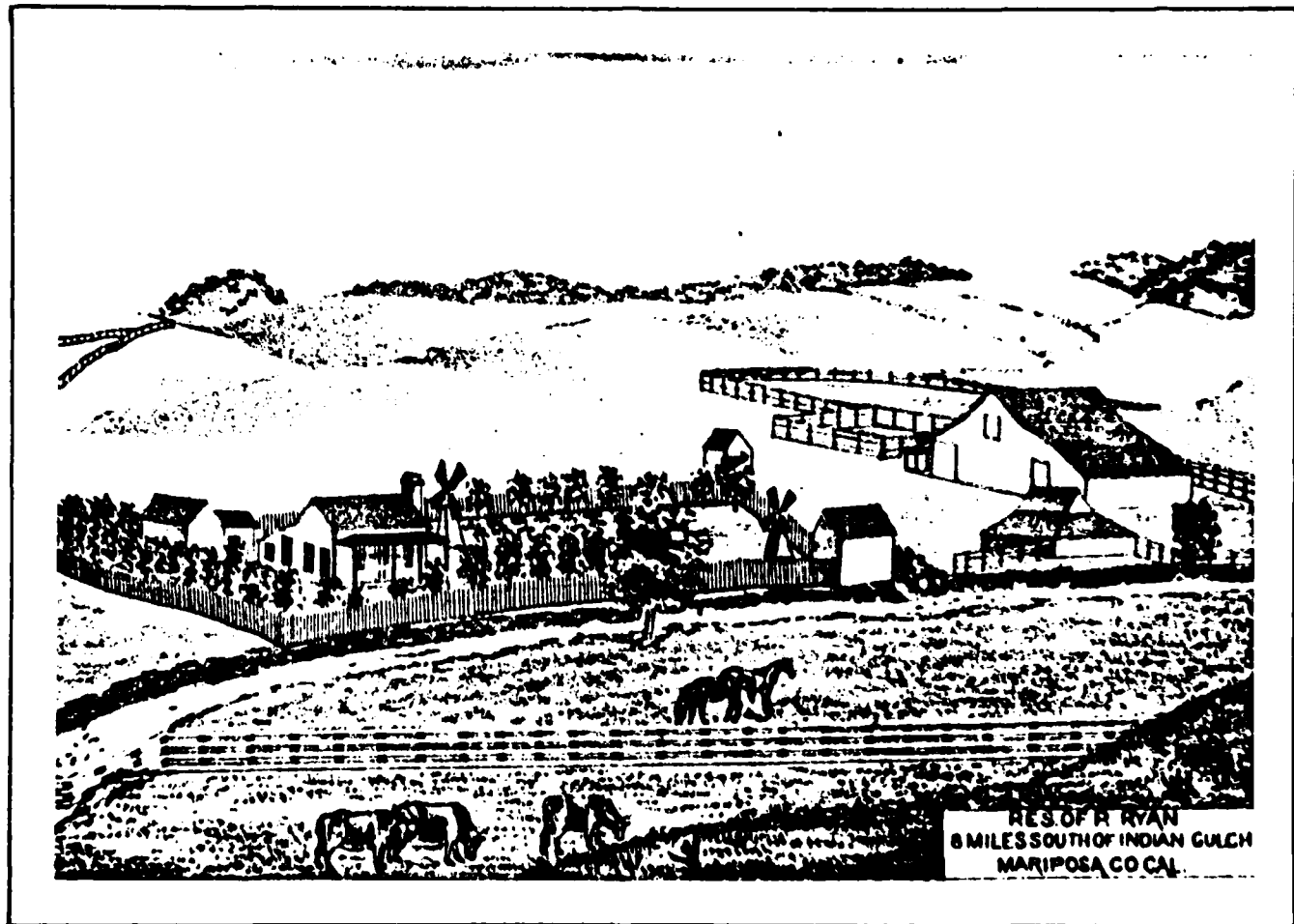
FIGURE 1

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Official Map of Mariposa County, 1897
(Courtesy of California State Library)

Figure 2



(Elliot and Moore 1880)
(Courtesy of California State Library)

Figure 3



"Res. of James Cunningham 16 miles east of Merced, Merced Co. California."

(Elliott and Moore 1880)

(Courtesy of California State Library)

The Cranes, Cornetts, and Chases further consolidated land holdings in the area in the early decades of this century. Harry Chase, for example, bought Pate out in 1917 and the Chase Ranch is still shown on contemporary maps.

Current owners of Bear Creek Reservoir area include Jeff Miller (Harry Chase's grandson) and Roy and Vava Morrison.

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APPENDIX 2

INTERVIEWS

As a part of the Scope-of-Work, interviews were required to be conducted with Native Americans, local residents, and other individuals who might have information on cultural resources and historical events which were associated with the project areas.

In compliance with this task, interviews were conducted by Jeanne Muñoz, Melinda Peak, and Ann Peak. Each interview has been summarized.

Follow-up (4) to
meeting in Mariposa:
attempt to contact
Wahilia Ocampo

Jeanne Muñoz
August 5, 1981

Wahilia Ocampo of the Indian Studies Department, Merced College, was recommended as a source of information by Fern Fulcher. She is out of town, in the process of moving, and the college does not know how to reach her.

Meeting in Mariposa
August 6, 1981

Coordinated by
Jeanne Muñoz

Eight Native Americans from Merced and Mariposa counties (Nick Brocchini, Fern Fulcher, Les James, Jean James, Jay Johnson, Mary Lewis, Frank Ogler, and Helen Ogler), Patti Johnson of the U.S. Army Corps of Engineers, and Harvey Crew and Jeanne Muñoz of Ann S. Peak & Associates met in Mariposa on the evening of August 6, 1981. Johnson, Crew, and Muñoz described the Merced County Streams Project, provided maps of the area and copies of reports of previous archeological research in the area for examination. The Native Americans asked questions, examined the materials, and expressed their interest in the Project. Names of potential Indian monitors were suggested and the possibility of other Indians visiting the Project was discussed. General concerns were voiced about such matters as appropriate treatment of burials.

No one of the eight knows of any historic use of the Project Area by Native Americans or of any sacred sites of gathering sites there.

Jeffrey Miller
563 South Brand Blvd.
San Fernando, CA 91340

Interviewed by Ann S. Peak
August 11, 1981
August 25, 1981

Mr. Miller spent considerable time on the property as a youth. He was shown the petroglyphs and old structural remains by his father.

Mr. Miller provided specific information on historic buildings, petroglyphs, and bedrock mortar sites in the Bear Creek study area. He gave details on the presence of several clusters of historic buildings, one of which had a stone fence in association. These houses were made of slate and had chimneys, foundations, and floors. One of these foundations was about 20' x 12' in dimensions.

He also stated that there is a stone slab marker with "Chinese" symbols inscribed on one face. However, he was unsure of its exact location.

He also described a stone slab building beyond the project boundaries and near the main Miller ranch headquarters on Miles Creek.

According to Mr. Miller, these buildings had always been called the Chinese gold mining camps and were reputed to date to the 1850s or 1860s.

Mr. Miller also stated that he had never seen arrowheads on the property and did not know of any collections.

John (Rusty) Brocchini
Oak Road
Mariposa, CA 95339

Interviewed by
Ann S. Peak,
August 14 and 15, 1981

The American Indian Council of Mariposa County was contacted on or about August 14, 1981, about recommending a Native American observer for Peak and Associates' cultural resources survey for the U.S. Army Corps of Engineers' Merced County Streams Project. Mr. Nick Brocchini indicated that his son, John (Rusty) Brocchini was available and had had experience in archeological investigations. Rusty contacted Ann Peak, president of the firm, on August 15, 1981, and he agreed to take the position as the Native American observer. He reported for work on August 17, 1981, and worked until September 3, 1981, when the field survey of the four reservoirs was completed.

Dwight Dutschke
SHPO Native American Coordinator

Interviewed by Jeanne Muñoz
August 19, 1981

Dwight does not know any Native Americans in the Project Area.

Nancy Evans
Native American Heritage Commission

Interviewed by Jeanne Muñoz
August 19, 1981

There are no Indians listed with the Native American Heritage Commission for Merced, Madera, or Mariposa counties. This does not mean none lives there, but that none has expressed any interest in participating in cultural heritage or cultural resource activities.

Allen Beck
Fresno City College

Interviewed by Jeanne Muñoz
August 20, 1981

Allen Beck does not know, or know of, any Native Americans in the Project Area.

Ed Castillo
University of California,
Santa Cruz

Interviewed by Jeanne Muñoz
August 28, 1981

Ed has been researching Spanish activity in the general Merced-Mariposa counties area during the early 1800s. He states that he cannot say with any certainty that the Merced County Streams Project Area was definitely Yokuts or definitely Miwok. He states that his data suggest that the Castle Dam area was more likely than not Yokuts, and that the Bear and Burns areas were either transitional or Miwok. He states also that the existing ethnographic maps are of no real use as there is so much disagreement.

176

Dick Johnson
Fresno Unified School District

Jeanne Muñoz
August-September, 1981

Attempts to reach Dick Johnson were unsuccessful.

Follow-up (2) to
meeting in Mariposa:
interviews with Jay Johnson

Interviewed by Jeanne Muñoz
August-September, 1981

Jay Johnson, a Miwok-Paiute, and Chairperson of the Native American Heritage Commission, was consulted about specific concerns among local Native Americans in regard to burials. He was later asked about petroglyphs in the Yosemite National Park area. He is very familiar with them, and is willing and able to examine those of the Project Area to determine possible stylistic affiliations.

Charles Ostrander
Merced College

Interviewed by Jeanne Muñoz
August-September, 1981

Mr. Ostrander is out of town.

Follow-up (3) to
meeting in Mariposa:
interviews with Fern
Fulcher

Interviewed by Jeanne Muñoz
September, 1981

Fern Fulcher, a part-Miwok resident of Atwater, volunteered to contact another Indian woman in Merced County (Denise Woodruff) and to find out if she might know anything about the Indians of the Project Area in the 1800s. At least 15 calls were placed to her, only two of which found her home and well enough to come to the phone. She was equally unsuccessful in reaching her acquaintance, and no new knowledge was gained.

Scott Pinkerton
P.O. Box 71
Mariposa, CA 95338

Interviewed by Melinda Peak
September 29, 1981

Mr. Pinkerton has done considerable research on the western portion of Mariposa County, focused on the county line. He has done research on the stone house in Merced County which had erroneously been attributed to Frémont. He has gone back to the original survey notes for the Frémont grant and identified the location of a log cabin used by Frémont on lower Mariposa Creek.

He has never been to the Bear Reservoir project area, but has surveyed land immediately south of the project area (for Harry Chase). He knew that there were supposed to be petroglyphs in that area. He had never heard of or seen the upright slab enclosures within the project area. He suggested that they might relate to the running of hogs from Mariposa to market at Merced.

By the late 1850s, the laws had changed and there were no Mexican miners left in Mariposa County. Many of the towns which had been predominantly Mexican were ghost towns by 1860. Nearby Toledo is a good example of this. The Chinese came into the Mariposa mining areas primarily in the 1860s and 1870s. They reworked many previously worked areas. Many old towns were totally or partially destroyed because the Chinese worked right up to the structures.

Many of the early structures were low--they have not fallen down. They consisted of half walls, topped by canvas. The canvas came from ships abandoned in San Francisco Bay during the gold rush.

The Chinese built their structures with at least one door or window oriented to the rising sun. The Chinese structures can also be identified by digging around for Chinese pottery. Also a number of wildcat bones may be present as the Chinese ate wildcats for strength.

The Stockton-Millerton Road was built along the foothills because of the annual flooding. It was the natural selection for a line when Merced County was divided off.

The book, Sam Ward and the gold rush, is the best source for the area.

Mr. Pinkerton believes that there is no one left who has information on the sites in Bear Reservoir. He gave the names of several people who lived or worked in the vicinity. They may have seen the sites but probably have no idea of their origin. He believes that, in the reservoir area, because it has been held as a portion of a large ranch for so many years, it will not be possible to learn any more about the structures.

Mr. Pinkerton has visited the site of Toledo and said that the sites at Bear sound similar. He believes the ovens may be of Mexican origin as they sound similar to those at Toledo, which was primarily Mexican.

Douglas Richards
(209) 389-4725

Interviewed by:
Ann S. Peak
Melinda Peak
December 10, 1981

Mr. Richards is the present tenant on the Miller properties in Bear Creek Reservoir. He stated that he did not know of any arrowheads, projectile points, or other artifacts found on the property. He was aware of some of the rock art, but had not found CA-Mrp-606 and several other of the petroglyph loci. He was also unaware of the presence of the prehistoric village sites although he had seen all of the historic structures.

Marcus Arguelles
2290 W. Lopez Ave.
Merced, CA 95340

Interviewed by Robert Gerry
March 30, 1982

Mr. Arguelles is a Ph.D. candidate in archeology and resides in Merced. As a local resident and an archeologist, it was suggested that he be contacted for information on the project areas.

Mr. Arguelles was familiar with the location of the project areas but had no knowledge of any sites within or near the project area and did not know of any collections of artifacts from there. He recommended Mr. Charles Ostrander of Merced Junior College as the most knowledgeable in Merced area archeology and suggested we contact him.

184 Blank

APPENDIX 3

AUGER TESTING

Twelve sites were augered to determine if a midden or cultural deposit was present and to assess the depth. Sites which were obviously isolated bedrock mortar stations, where soils were the same as the surrounding natural soils, were not tested. All sites, with the exception of CA-Mrp-608, had three tests (or more where deemed necessary to return adequate data). At CA-Mrp-608, an isolated bedrock mortar site, the soils had a slightly darker soil than the surrounding slopes. The one test hole found sterile clays and no more tests were deemed necessary.

The auger holes were done either with a 3-inch auger or, if the soils were very rocky, a round-nosed shovel was used. The auger or test holes were dug to sterile soils/bedrock or as far as the auger or shovel could effectively achieve. Shovel testing becomes difficult below one meter depth in a hole no wider than the shovel blade. To dig below this depth would have entailed extensive widening of the test hole to such a degree that too large an area of midden would have been disturbed. Sterile, in this context, means that cultural deposits are absent. Sterile was usually determined by a soil color or textural change and the absence of artifactual materials. All soil was shovel broadcast and carefully examined for artifacts by slowly troweling across the surface of the extracted soil. Upon completion of the augering, the holes were backfilled and the soils compacted. All auger holes were related to site datum by distance and bearing with proper entry on the site map (site maps show locations of auger tests).

For those sites which had Munsell color readings done on soils, the results have been added to the logs.

AUGER LOG, BEAR RESERVOIR

CA-Mrp-402Test Hole #1

Depth: 0-55cm to sterile
Soil: dark brown friable midden
Artifacts: 3 pestles, 5 ground stone fragments, 2 cores,
15 flakes
Location: E side of Bear Creek, N of petroglyph pond
Munsell: 10YR 4/2

Test Hole #2

Depth: 0-30cm, sterile
Soil: light brown silty clay hardpan
Artifacts: none
Location: E side of Bear Creek, W side of ephemeral
stream

Test Hole #3

Depth: 0-35cm to sterile
Soil: medium dark brown compacted friable midden
Artifacts: metate fragment, ground stone fragment, 2
flakes
Munsell: 10YR 4/2

CA-Mrp-407Test Hole #1

Depth: 0-4cm to soil change-sterile
Soil: brown silt--not midden overlies light brown
compacted clay
Artifacts: 7 flakes of volcanic rock, fire-cracked rock

Test Hole #2

Depth: 0-90cm to soil change-sterile
Soil: brown silt--not midden overlies light-brown
compacted clay
Artifacts: 10 flakes of volcanic rock, silicate, fire-
cracked rock, 2 ground stone fragments

Test Hole #3

Depth: 0-45cm
Soil: sterile light-brown clay not cultural deposit
Artifacts: none

CA-Mrp-408Test Hole #1

Depth: 0-45cm to color and textural change
Soil: dark grey-brown midden over light-brown compacted clay
Artifacts: numerous flakes of obsidian, silicates, quartzite, and volcanic rock, fire-cracked rock

Test Hole #2

Depth: 0-55cm to color and texture change
Soil: lighter grey-brown midden over same light-brown compacted clay, as seen in No. 1
Artifacts: 12 flakes of obsidian, volcanic rock, silicates, and quartzite fire-cracked rock

Test Hole #3

Depth: 0-45cm
Soil: dark grey-brown midden over light-brown compacted clays
Artifacts: same density of flakes as in No. 1, fire-cracked rock
Location: in pothunters' pit

CA-Mrp-599Test Hole #1

Depth: 0-20cm to caliche hardpan
Soil: caliche
Artifacts: none

Test Hole #2

Depth: 0-60cm to caliche
Soil: medium-brown friable
Artifacts: none

Test Hole #3

Depth: 0-45cm to bedrock
Soil: light-brown clay silt
Artifacts: none

CA-Mrp-600Test Hole #1

Depth: 0-30cm to bedrock.
Soil: dark friable silt
Artifacts: one possible piece of fire-cracked rock

Test Hole #2

Depth: 0-64cm to cobble layer
Soil: dark-brown friable midden
Artifacts: 4 quartz flakes, 5 metavolcanic flakes, cut
and polished chialstolite crystal, 3 pieces
ground stone, 7 kilo of fire-cracked rock,
3 tiny fragments of freshwater clam shell
Munsell: 10YR 4/2

Test Hole #3

Depth: 0-30cm
Soil: light-brown compacted silt
Artifacts: none

CA-Mrp-604Test Hole #1

Depth: 0-30cm to slate bedrock
Soil: medium dark grey-brown compacted friable midden
Artifacts: 1 mano, 1 quartzite core, 3 flakes, fire-
cracked rock
Munsell: 10YR 4/2

Test Hole #2

Depth: 0-40cm
Soil: medium dark grey-brown compacted friable midden
Artifacts: 3 quartz flakes, 2 basalt flakes, 2 small
quartzite cores, fire-cracked rock
Munsell: 10YR 4/2

Test Hole #3

Depth: 0-30cm to slate bedrock
Soil: medium dark grey-brown compacted friable midden
Artifacts: none
Munsell: 10YR 4/2

Test Hole #4

Depth: 0-120cm
 Soil: medium dark grey-brown compacted midden to
 90cm; dark red-brown moist friable colluvial
 soil 120cm
 Artifacts: 2 core fragments, 2 quartzite flakes,
 1 obsidian flake
 Munsell: 10YR 4/2

CA-Mrp-608Test Hole #1

Depth: 0-30cm to bedrock
 Soil: grey-brown clay silt
 Artifacts: none

(Only one test hole as there was no midden cultural deposit present.)

CA-Mrp-610Test Hole #1

Depth: 0-20cm, sterile
 Soil: compacted clay silt
 Artifacts: none

Test Hole #2

Depth: 0-100cm
 Soil: medium brown soft friable midden
 Artifacts: 3 cores, 3 ground stone fragments, 5 flakes,
 possible slate cairn stone, human bone
 Munsell: 10YR 4/2

Test Hole #3

Depth: 0-100cm
 Soil: medium brown soft friable midden
 Artifacts: 2 flakes, pestle, 3-5 cores
 Munsell: 10TR 4/2

Note: Rock feature at 95-100cm--possible cairn burial--terminated at this point. Human bone?

Test Hole #4

Depth: 0-90cm
 Soil: medium brown soft friable midden
 Artifacts: 5 cores, 2 pestles, 1 mano fragment, other
 possible ground stone fragments, 6 flakes,
 chopper, quartz crystal
 Munsell: 10YR 4/2

CA-Mrp-611Test Hole #1

Depth: 0-30cm
Soil: medium dark grey-brown, compacted friable midden
Artifacts: 2 quartz flakes, 1 quartz core fragment, 3 ground stone fragments
Location: near slate outcrop under oak, see site map
Munsell: 10YR 5/1

Test Hole #2

Depth: 0-80cm
Soil: light grey-brown, friable midden, compacted to 0-30cm
Artifacts: 3 ground stone fragments, 2 flakes, 2 cores, 1 quartzite core scraper
Location: on mound SW of Housepit #3, see site map
Munsell: 10YR 4/2

Test Hole #3

Depth: 0-50cm
Soil: light grey-brown friable midden, compacted to 0-30cm
Artifacts: 2 ground stone fragments, 1 core
Location: east of Housepit #7, see site map
Munsell: 10YR 4/2

CA-Mrp-612Test Hole #1

Depth: 0-90cm
Soil: dark grey-brown friable midden
Artifacts: 7 flakes, 2 ground stone fragments, 1 quartzite core

Test Hole #2

Depth: 0-50cm
Soil: light brown silty midden(?), very compacted and friable
Artifacts: 3 ground stone fragments, 6 flakes

Test Hole #3

Depth: 0-50cm
Soil: light brown silty midden, compacted and friable
Artifacts: 1 quartzite flake

CA-Mrp-615Locus 1Test Hole #1

Depth: 0--90-95cm
Soil: brown silt
Artifacts: white ceramic, 1 obsidian flake, 1 core tool,
2 chert flakes, 1 volcanic, human bone
Munsell: 10YR 4/2

Test Hole #2

Depth: 0-85cm
Soil: grey brown silt, brown silt from 70cm
Artifacts: 1 flake
Munsell: 10YR 4/2

Test Hole #3

Depth: 0-80cm
Soil: dark greyish brown
Artifacts: 5 flakes
Munsell: 10YR 4/2

Locus 2Test Hole #1

Depth: 0-100cm
Soil: dark grey brown friable midden over brown
silty soil at 90cm
Artifacts: quartz core, 30+ flakes, ground stone frag-
ments, pestles, manos
Munsell: 10YR 4/2

Test Hole #2

Depth: 0-110cm
Soil: dark grey brown friable midden over brown silty
soil at 110cm
Artifacts: portable bowl mortar, acorn anvil, metate at
60cm, cores, drilled striated slate slab,
charmstone, bipoint chiastolite pin
Munsell: 10YR 4/2

Test Hole #3

Depth: 0-90cm
Soil: dark grey brown friable midden to 70cm,
lighter brown silty soil to 90cm
Artifacts: 4 manos, 2 pestles, 30 flakes, 3 cores, banana
stone
Munsell: 10YR 4/2

193 Blank

193

APPENDIX 4

CONCORDANCE OF FIELD NUMBERS AND
PERMANENT TRINOMIALS

Field Number	Trinomial Designation
CA-Mrp-397	CA-Mer-237
C-1-2-5	CA-Mrp-597
C-2-1-3	CA-Mrp-598
C-2-1-2	CA-Mrp-599
C-1-2-21	CA-Mrp-600
C-1-3-2 (C-1-3-3)	CA-Mrp-601
C-1-10-2	CA-Mrp-602
C-1-2-16	CA-Mrp-603
C-1-6-1	CA-Mrp-604
C-1-3-1	CA-Mrp-605
C-1-2-7	CA-Mrp-606
C-1-10-3	CA-Mrp-607
C-2-2-1	CA-Mrp-608
C-1-2-19	CA-Mrp-609
C-1-2-8	CA-Mrp-610
C-1-6-2	CA-Mrp-611
C-1-3-7	CA-Mrp-612
C-1-2-20	CA-Mrp-613
C-1-3-5	CA-Mrp-614
C-1-2-10	CA-Mrp-615
C-1-10-1	CA-Mrp-616